

# ResearchReport

Kondinin Group

JANUARY 2016 No. 288 [www.farmingahead.com.au](http://www.farmingahead.com.au)



## EXCLUSION FENCING FIGHTING FERALS

Independent information for agriculture



# Exclusion fences keep ferals at bay

Fencing out pests, rather than fencing in productive animals may be a different way of thinking for some farmers.  
By Josh Giumelli and Ben White

**T**he traditional approach to fencing has been containment, but a growing number of farmers, frustrated by stock losses or reduced grazing capacity, are turning to exclusion, or feral fencing.

Whether it's lambs lost to wild dogs or pigs, or pasture and crops lost to hungry kangaroos, feral animals can have a significant impact on the bottom line. In drought years, they can often be the difference between surviving or going bust.

In extensive grazing areas such as south western Queensland, producers have had to either switch from sheep to cattle, or leave the land completely due to the damage done by wild dogs.

But other farmers have formed groups with their neighbours and fenced an entire group of properties in a single exclusion perimeter fence. It is not uncommon for the fences that enclose these 'clusters' of properties to be 200 or 300km in length, surrounding a hundred thousand hectares or more.

Many exclusion fencing designs were pioneered in Queensland, and are now attracting keen interest from farmers in other states with their own feral animal issues. For this reason, Kondinin Group engineers Ben White and Josh Giumelli travelled through south western Queensland, inspecting several fences and talking to the farmers who built them.



**Hitting the wall:** Fences will face immense pressure in the months after they have been erected. Maintenance must be kept up as animals learn to respect the barrier. This fence is part of the Morven Cluster and shows evidence of kangaroo impact.



**Broken wire:** A multi-strand barbed wire fence is no match for determined kangaroos, who will push under the fence, spreading the barbs. The continual movement of the wire eventually causes it to wear through at the post.



**Ferals:** Kondinin Group engineers travelled around south west Queensland inspecting several exclusion or feral fences. The fence pictured is part of the Tomoo Creek cluster, which encompasses 232,000ha.



### THE NEED FOR EXCLUSION

Wild dog attacks can decimate a flock, with some farmers reporting lambing percentages of less than 10%. While stock losses are an obvious financial blow, animal welfare is just as important, and the aftermath of a dog attack can be particularly distressing for farmers.

Reducing grazing pressure from kangaroos makes a convincing argument in favour of exclusion fences. A kangaroo has a DSE (dry sheep equivalent) of 0.625, so 1000 roos will eat as much as 625 sheep.

An effective exclusion barrier will keep the pests on the outside of the property boundary where they belong, but they are not cheap. It is not uncommon to spend

\$4000-\$5000 per kilometre on materials alone. And depending on the terrain, soil and vegetation, a feral fence can consume considerable labour during construction. Many farmers we spoke to put the overall total cost including labour at \$7000 to \$8000 per kilometre.

For this reason, the construction of any exclusion fence is not a light undertaking, and may need serious costing, as well as a visit to the bank manager. If a successful style of exclusion fence is constructed, then the benefits on paper will be translated to the farm business. It is vital that you are absolutely sure of the design of the fence before you start, as replacing a failed,

ineffective fence will cost far more than putting up the right fence the first time.

### ANIMAL ACTION

When designing your fence, pay particular attention to others who have effectively fenced their properties in your area.

Failing that, study and research the behaviour of the animals being fenced out, and design the fence accordingly. Table 1 lists the preferred modes of action of both pests and domestic animals when breaching a fence.

Normal fences have a gap under the bottom wire to prevent corrosion of the wire, or shorting in the case of electric fences.

### FENCE FINANCE AND FUNDING

With the material cost of constructing an exclusion fence between \$3000 and \$5000 per km, a significant investment is required to circumnavigate a property.

Working collectively with neighbours can reduce the outlay by sharing the capital costs and enclosing a larger area combining two or more farms, or sharing fencing costs of a common boundary.

The concept of “clusters” can be an effective tool in encompassing a large area owned by a number of landholders with the minimal length of fence as possible.

### FUNDING AND CONCESSIONAL LOAN SUPPORT

Early last year, Agriculture Minister Barnaby Joyce announced \$25.8 million in federal government support for a weed and feral animal drought assistance program, indicating a priority for cluster fencing projects. This funding is additional to some state government funding allocations for pest animal management.

According to the federal Department of Agriculture, the funding will have an initial focus in New South Wales and Queensland but will be made available in all states experiencing severe rainfall deficiencies.

Queensland has one of the largest allocations of funding for projects including baiting, trapping and exclusion fencing with applications closed and successful applicants soon to be announced.

Another option for farmers looking for support to build an exclusion fence in Queensland is a concessional sustainability loan through the Queensland Rural Adjustment Authority (QRAA). [www.qraa.qld.gov.au](http://www.qraa.qld.gov.au)

TABLE 1 Animal behaviour with fencing

Animal	Method for breaching fences						
	Push over	Push under	Push through	Dig under	Climb over	Scramble over	Jump over
<b>Grazing animals</b>							
Cattle	2		1				
Sheep		1					
Goats		2	1		3		
Deer			1				2
Geese		1					
<b>Grazing pests</b>							
Kangaroos and wallabies		1	2				3
Rabbits and hares		2	1	3			
Emus	1					2	
Feral goats		2	1		3		
Pigs		2	1		3		
Wombats		2	1	3			
Possums		2	1	3			
<b>Predators</b>							
Foxes			1	3	4	2	
Feral dogs and dingoes		2	1			3	
Feral cats			1			2	
Feral pigs		2	1	3			

1: first preference, 2: second preference, 3: third preference etc.

Adapted from Lund and De Silva, Wires and Pliers, Kondinin Group 1994

The NSW government is also offering concessional interest loans for infrastructure including fences through their Farm Innovation Fund Loan scheme administered through the NSW Rural Adjustment Authority. [www.raa.nsw.gov.au](http://www.raa.nsw.gov.au)

### SELF-FUNDED FENCES MAY PAY

Depending on the production impact of pest animals on a farming operation and the availability of cash in the business, an internally funded fence may provide an adequate return to justify the investment in

exclusion fence infrastructure.

Costs will need to include an allowance for earthworks and materials required for the length of fence, including gateways and end assemblies and sectional fence joins. Labour costs can be as much as a third of the cost of the fence.

The return on investment hinges on an increase in productivity through the reduced pressure on production. This may be in the form of an improved stock carrying capacity, reduced stock losses to predators or higher crop yields, all of which will initially have to be estimated.





**Escape way:** Animals escaping the exclusion zone can push under aprons, eventually creating a track that allows others to find a way back in.

Burrowing animals can easily breach a fence even when the base of the prefabricated section sits on the ground. Much of the design of exclusion fences centres on preventing this behaviour through the use of apron sections.

Animals which tend to push through a fence will be slowed by the use of tighter line wire spacing, electricity, or prefabricated fencing with closely spaced vertical pickets. Most prefab wire used in exclusion fences has 150mm picket spacing. Most wire manufacturers can incorporate a multitude of closely-spaced horizontal wires on the bottom of their prefab sections, effectively closing the gaps. Fence height plays a large part in controlling feral animals. While it costs more, many farmers have opted to go a little higher, just in case animal behaviour adapts, such as dogs learning to climb. As a rule of thumb, smaller kangaroos and wallabies will rarely jump a 1200mm high fence, or 1500mm for larger kangaroos. Dogs require at least a 1500mm fence. But many fences are built to a height of 1800mm, often with prefabricated wire to 1500mm and a top barbed wire or two bring total height to 1800mm. This will keep out the small percentage of large kangaroos which can scale a 1500mm fence, and prove a formidable barrier to climbing animals.

Kangaroos pose a particular problem as they are capable of pushing through, burrowing under or hopping straight over fencing. While their preference is always to go under the fence or push through the

lower wires, kangaroos will jump a fence when cornered, or find another way through.

Kangaroos will hop along a fence line before jumping the fence in a near vertical leap, rather than attacking the fence at a right angle.

Dogs are cunning and can learn how to breach a seemingly impenetrable fence. Their first instinct is to push through or under a fence, they will learn to scramble over a fence if desperate enough. Any damaged fence sections will be quickly taken advantage of.

### EXCLUSION FENCE COMPONENTS

#### Posts

Posts are one of the keys to a strong fence. The closer the spacing, the less likely the fence will be bowled over, but they do add considerably to the cost. Most fences use a combination of standard steel galvanised posts, with a heavy duty post inserted after every three or four regular posts. This gives additional support to the fence, while keeping costs lower, as heavy duty posts cost roughly twice as much as a regular post. Average post spacing is between six to eight metres.

The depth the post is inserted in the ground will also have a large bearing on fence strength. Although it is hard to tell once a fence is constructed, heavy duty posts tend to be used in a longer length (eg 2400mm) and inserted deeper, compared to regular posts which may be only 2100mm long.

**Table 2: Feral fencing prefabricated wire**

Waratah Stocksafes-T	
7/90/30	square knot
8/90/30	square knot
11/90/15	square knot
13/90/15	square knot
15/150/15	square knot
11/90/15	square knot, 300mm hinged apron
15/150/15	square knot, 300mm hinged apron
Waratah Stockgrip <sup>A</sup>	
7/90/30	fixed knot
8/90/15 <sup>B</sup>	fixed knot
16/180/15	fixed knot
Clipex Tuffknot	
7/82/30	fixed knot
7/90/30	fixed knot
8/90/15 <sup>B</sup>	fixed knot
12/90/15 <sup>B</sup>	fixed knot
9/110/15	fixed knot
14/150/15	fixed knot
16/180/15	fixed knot
Clipex S-fence	
7/82/15 <sup>B</sup>	square knot
15/145/15	square knot, 250mm hinged apron
17/175/15	square knot, 250mm hinged apron
Whites Wires Stiff Stay Feral fence	
13/90/15	square knot
13/115/15	square knot
15/150/15	square knot
Southern Wire Farmfence Vermin	
8/115/15	square knot
8/150/30	square knot
15/150/15	square knot
11/90/15	square knot
11/90/15	square knot, with hinged apron
Southern Wire Griplock	
7/90/30	fixed knot
8/90/15 <sup>B</sup>	fixed knot
Southern Wire Griplock Exotic	
8/120/15 <sup>B</sup>	fixed knot
10/110/15	fixed knot
13/190/15 <sup>B</sup>	fixed knot
15/150/15 <sup>B</sup>	fixed knot
17/190/15 <sup>B</sup>	fixed knot
20/240/15 <sup>B</sup>	fixed knot

**Notes:** Prefabricated nomenclature – 8/150/30 has eight horizontal wires, 150cm high section and 30cm between pickets. Not all products in each range listed, especially those with wider picket spacing. A: Custom sizes available for large orders. B: Also available with 30cm picket spacing.



Fences experience loading from animal pressure (mainly impact), floods, falling tree branches, and wind loading from vegetation build-up. Accumulated vegetation, such as 'roly poly', can sit in a large, tall pile against the fence, and act as a sail. We have seen photos of fences with every single post snapped off at ground level due to this.

Quick attach posts, such as Clipex, Waratah JIO and the Southern Wire Rapid post, are ideally suited to exclusion fencing. The amount of work involved in constructing an average fence that may be 20 or 30km long is huge, and the timesaving benefits of a quick attach system cannot be overstated.

If you are looking to save money, don't skimp on the posts, and don't be tempted to save a few dollars by using black steel posts. Of all the fences viewed by Kondinin Group, every single one was constructed with galvanised posts.

### Wire

Surprisingly, little plain wire is used in exclusion fencing, apart from the occasional selvedge or support wire used to strengthen a prefabricated fence. Some fences have a plain wire run out initially to sight the line, which is then incorporated into the fence design. A low selvedge wire can be used to help stiffen the apron if additional downwards pressure is required.

Barbed wire is commonly used in a single or double strand above a prefabricated section to raise the overall height of the fence, although several fence designs have eliminated this altogether. Barb has been used initially as a sighter wire, and is sometimes incorporated into the fence as a selvedge wire. This has the advantage of not only providing additional support to the prefab, but deterring animals from climbing the fence.

### Prefabricated wire

Most exclusion fences use a prefabricated fence section as the basis of the fence design. As can be seen from Table 2, there are a multitude to choose from, from several different manufacturers.

Apart from an imposing physical barrier, prefab wire also acts as a visual barrier, helping prevent additional pressure from animals which may otherwise contact the fence. Almost all fences use a 150mm picket spacing, which prevents most animals from trying to push their heads through the wire. Lower horizontal wires are spaced close together, as little as 75mm, to further reduce the opening size.

There are a variety of different knots used in prefabricated section, and most manufacturers have a large, fixed knot which wraps both the vertical picket and the horizontal line wire (eg Clipex Tuff

knot, Waratah Stockgrip, Southern Wire Griplock). This knot is the most durable, and seems to be best at helping a fence distribute impact loads.

The square knot (eg Waratah Stocksaf-T, Southern Wire Farmfence, Whites Stiffstay and Clipex S-fence) is a more compact knot, and well suited to exclusion fencing. It is generally a little cheaper than the equivalent fence in the fixed knot style. Both types of knots lock the line wires rigidly with one-piece vertical pickets, and have no exposed ends which can snag an animal.

Prefab fence sections with hinge knots or ring-style knots do not seem to be widely used in exclusion fences. Hinge knots do not have a stiff, one-piece vertical pickets which are crucial to maintaining downwards pressure on the ground, preventing animals pushing underneath. Ring-style knots are more likely to loosen with repeated animal pressure, and have exposed ends which may help snare an animal as it tries to breach the fence.

### Aprons or footers

An apron or footer is used on the more impenetrable barriers, and seems to be a feature of most serious exclusion fences. Other than burying the bottom section of prefab in a trench, it is probably the best way to prevent animals breaching a fence who tend to burrow or push under as their first choice. The apron sits on the outside of the exclusion fence.

There are two main styles of aprons in use, the fixed apron and the hinged apron, and the choice between the two will come down to a range of factors.

A fixed or folded apron is formed by the bottom of the prefabricated section, which is allowed to flare out at the base of the fence. For example, a common fence design uses a 1800mm tall prefab section, which is placed at a height of 1500mm. The apron is formed by the bottom 300mm which bends out along the ground.

Fixed aprons put a fair amount of downwards pressure on the ground, preventing animals from getting under the leading edge of the wire. But they also press back against the posts, and will generally require heavier, deeper or more closely spaced posts to help resist the force. This is especially true in shifting soil types.

Hinged aprons are usually attached during the manufacture of the prefab section, and generally consist of a 250 or 300mm fence section which is attached to the bottom wire with a hinge knot.

This allows the apron to be bent out at right angles to the bottom of the fence, with the apron sitting flat on the ground, as opposed to a fixed apron, which has a gradual curve, with only the last wire or two contacting the ground.



Wire - barb most often used.



Prefabricated wire.



Hinged apron.



Hinged aprons will have much less downwards pressure on the ground, but this also depends on how the apron is tensioned, and the use of outriggers on end assemblies and intermediate posts. They do allow the bottom wire of the main fence section to sit on or near ground level, and the fence can be tied much closer to the base of the posts than with a fixed apron.

A further style is the removable apron, which is similar in form to the hinged apron. It is an additional length of prefab or netting which has been clipped to the bottom wire, and has often been added later to an existing fence to increase its resistance to burrowing animals. The beauty of a removable apron is it can be replaced if damaged by corrosion.

A hinged apron which corrodes can be replaced by a removable apron (or even left in place with the new apron added on top). In areas with corrosive soils, these styles are recommended over the fixed apron, as damage to the hinged or removable apron will not affect the integrity of the rest of the prefab fence section. Any corrosion to a fixed apron will weaken the bottom of the fence, as tension is carried through the base line wires, and stiffness will be reduced if the vertical pickets are affected.

Some farmers with corrosive soils avoid the fixed apron as the additional ground pressure forces the apron into the ground, especially when conditions become muddy. Hinged aprons can also become buried as animals travel up and down the outside of the fence, pressing the apron into the ground. However, others will purposely bury the apron by grading a small rill over the edge to further resist burrowing animals. It all depends on your conditions and soil type.

The main drawback to a removable apron is simply the additional work required to install it as the fence is being constructed. As the apron is clipped on right at ground level with closely spaced clips, the work is laborious over several kilometres of fencing.

**Netting**

Netting has traditionally been used to control vermin such as foxes and rabbits, but is now used less often. This is due to the success of alternative control measures (eg Calici virus ), and the ability of manufacturers to tie prefabricated wire into smaller squares along the bottom of the section. Netting is a lighter weight fencing material and will not have the longevity of prefab products, but can be used along the base of an exclusion fence, or as a removable apron. To combat animals which readily climb fences (eg cats and foxes), netting can be used as a ‘floppy top’, which hangs over the top of the fence to the outside of the exclusion zone.



Fixed apron.  
Photo: Clipex



Netting.  
Photo: australianwildlife.org



Electricity.



Earthworks.





End assemblies.



Intermediate posts.

Gates.  
Photo: Andrew Turnbull

### Electricity

Electric exclusion fence design polarised opinion among farmers we spoke with, with those who report it worked, and those who say it had given trouble.

Certainly, prefabricated styles were far more prevalent, although we saw several sporting electric offset or trip wires. One benefit of the prefab style is it poses more of an imposing physical, visual barrier compared to an electric fence. But electric fences are quicker to put up, and will cost much less in materials.

There are a multitude of styles of electric exclusion fence, with different arrangements of hot and earth wires set at different spacings, and far too many to cover here. Commercial styles include the Weston fence and the Dingo fence (see page 30).

In general, electric fences tend to be more used in conjunction with prefabricated style fences, rather than as a replacement. Outrigger wires, or trip wires, are often run near the ground and offset to the base so the animal gets a shock before it contacts the fence. Other designs see hot wires run on smaller outriggers higher up on the exclusion fence, or even above the prefabricated section, to deter climbing animals.

The biggest issue with electric-only fencing is maintenance. Patrolling long fencelines looking for shorts can be an almost full time job. Pasture growth can cause shorts or reduced fence performance. Once a loss of current occurs, animals quickly learn the fence poses no barrier, and considerable damage can occur. Several farmers have reported instances of echidnas perishing after becoming trapped in electric fences.

### Earthworks

Earthworks are often overlooked when costing a fence, and could easily add \$1000 per kilometre or more to the price. If clearing for a new fence through bush, expect considerable expense. Even when replacing an existing fence, the removal and cleanup of the fence line will involve a lot of work.

Effective exclusion fences rely on well-prepared and graded fence lines, with no dips or hollows, and a wide cleared area on either side to reduce damage from branches, improve fence visibility and access for maintenance.

Even when constructing a fence, the prefabricated wire will need to be run out flat along the ground, which may require at least 1800m just for the fence wire, then at least double that for vehicle movement alongside the wire, so a wide cleared strip is essential. Prefab fencing cannot be strained up effectively over rough ground littered with rocks and stumps. Some fencing machinery used on large exclusion fences unrolls prefab section vertically, and the fence can be strained





Crimps.



Gripples.

standing up. In this case a narrower cleared strip may be possible. Don't forget to take erosion into account when preparing for an exclusion fence. A lack of vegetation can cause significant erosion during a major rain event, especially on sloping ground. Animal movement up an down the line will also cause erosion. Make sure run-offs are constructed where large volumes of water are expected.

**End assemblies**

No fence will maintain its strength without decent end assemblies. As some fences top out at 1800mm, there is a large amount of leverage acting on the assembly due to tension at the top of the post. Strainer assembly designs vary widely, but those on shifting soil types often consist of several box frames linked together, and sometimes incorporate a diagonal strut at the fence end.

End assemblies are almost always built entirely of steel (pipe or RHS) and set deep into the ground. They are often concreted, but can be driven straight in if soil type allows. Remember, depth of set is far more important than the width of the post in resisting sideways forces.

**Intermediate posts**

Intermediate or in-line strainer posts are essential in maintaining fence integrity, and

assisting with straining the fence during construction, but many fences seemed to be constructed without them, possibly relying on deeply-set, heavy duty intermediate posts to improve fence strength.

In-line posts maintain fence tension, and along with the fence posts, help resist the fence toppling over from wind loading, animal pressure or floods. The closer the in-line strainer posts, the better able a fence is to resist a sideways force.

Contacts at Waratah recommend one every 500m (two 250m rolls), or 750m at an absolute maximum if the ground is dead flat. If you are going to use few inline posts, fence wire needs to be continuously strained every two rolls or so. We have heard of one fence with a continuous strain totalling 8km, which sounds excessive.

**Gates**

All fences need gates, and they should not become the weakest link in the exclusion barrier. It is important to grade the ground under the gate to leave as little gap as possible. Animals will attempt to burrow under a gate just as they will under a fence, so consider burying a steel or concrete barrier under the gateway. For well-trafficked areas, it may pay to eliminate the gates and use a grid for convenience.

Some farmers put gates in at regular intervals (eg every 3km) to aid access when fighting fires, as they were concerned the fence would otherwise be cut. Large signs with numbers are added to gates (often including a UHF channel) to help when directing access (eg for fire fighting) or reporting problems.

**Joiners**

Joining an 18 strand section of prefabricated wire is tedious in the extreme, especially if you are using short rolls (eg 100m) rather than 250m rolls. While we have seen some sections hand tied, the vast majority used either Gripples or Crimps.

Gripples are by far the quicker joiner, as wire is simply inserted into wither end, but they are more expensive, and can cost between \$1.50 to \$2.00 each depending on the order quantity.

Crimps are more cost effective (about 0.30c each) but take about five separate swaging operations with a crimping tool for each joiner. They are probably the more reliable joining method.

Hand tied joins take considerable time, and can result in some line wires becoming over or under-strained. Also, it is physically difficult to tie lower wires where the vertical spacing is as little as 75mm.

**ELECTRIC OPTIONS**

Kondinin Group engineers inspected some neat electric exclusion fences, including the Dingo Fence in Queensland (not to be confused with the state dingo fence), and an electrified prefabricated fence in the great southern region of Western Australia.

Paul O'Meehan of Borden, WA, farms at the foot of the Stirling Ranges and faces immense pressure from emus and kangaroos migrating from the national park. He has constructed an electrified prefabricated fence, by placing a 50mm poly pipe sleeve over a regular steel post. A selvage wire and the top prefab wire are tied on by an insulated wire passing through the top hole of the post. Other ties simply go around the back of the pipe. The fence sits clear of the ground by almost 300mm. Paul says it is very effective,



O'Meehan fence.

especially as he uses an electric fence energiser, with a large reserve capacity.

**Weston Fence**

The Weston fence is an all-electric fence using standard steel posts at 10-15m spacings with 1 poly-dropper clipped to, and 2 between each steel post using 4mm spring-clips. A range of dropper-threaded wire spacing and strand configurations are available. Prices for a standard 7-hole 1100mm high dropper start at \$3.32 including GST to just under \$5 for a 9-hole 1650mm dropper. Contact: 1800 133 623

**Dingo Fence**

A machine built by Gary Briggs from mini-loader manufacturer Dingo Australia utilises an all-electric approach to exclusion fencing. With alternating hot and earth wires, the



Dingo fence.

system is mounted on a customised fencing machine using a cassette of 2km Southern Wire reels threaded through custom-extruded aluminium posts and tailored porcelain insulators.

Its claimed up to 6km of fence can be installed per day, and posts are spaced at 30m with poly droppers at 10m spacings. The fence is loosely tensioned and while Gary admits this will see some kangaroo leakage, he adds that this also avoids trapped kangaroos in the fence, causing damage and shorts. Essential to the system working effectively, Gary says that clearing trees and vegetation away from the fence-line prior to installation prevents vegetation shorts.

Working with electric fence manufacturer JVA, a high-powered electric fence unit capable of energising 10km fence runs is used which can be controlled using a mobile phone (if you have network coverage). Alerts of shorts can be identified specific to fence sections negating the need for regular fence runs to check the fence. As with all electric exclusion fences, Echidnas can be an issue at times when they push between the bottom cold wire and the hot wire immediately above.

Cost is between \$4-6000 per km installed, depending on gates and terrain. Contact: Gary Briggs: 0417 977 451



**Fixed knot:** This style of knot is the strongest prefabricated fence knot and is used on Clipex Tuffknot, Waratah Stockgrip and Southern Wire Griplock.

# Exclusion Fence products

## Waratah

Waratah produces two distinct styles of prefabricated fencing for exclusion uses - Stocksafe-T and Stockgrip, both with longlife coating. Most people would be more familiar with the Stocksafe-T product, which has a square style knot which holds the pickets vertically without hinging. Wires are spaced as close as 76mm along the bottom of the section. Stocksafe-T is also available with a 300mm apron attached along the bottom of the fence on hinge

### Hints and tips

- If cost is an issue, start by fencing small sensitive areas such as calving or lambing paddocks.
- Once a dog fence is completed, control measures are essential and should be undertaken immediately as the dogs are now fenced in. A combination of shooting, baiting and trapping should be considered.
- Maintenance regimens should be more intensive for the first three months to repair damage as animals learn to respect the new fence.
- If your soil type is corrosive, use a removable apron, or a hinged apron which is more easily repaired down the track.
- Echidnas can leave burrows under fences which are then exploited by other animals such as dogs.
- Consider your neighbours and discuss fencing plans well in advance of construction. It is likely they will have concerns about the displaced animals and the effects on their business.
- Neighbours who are unwilling to commit to half the cost of a new exclusion fence may be happier contributing half the cost of an equivalent standard boundary fence.

joint knots, allowing it to form a 90 degree bend at the base of the fence, and sit flat on the ground. The hinged section has three additional wires spaced at 102mm. All sections have a heavier 2.8mm top and bottom wire.

A product less familiar is the newer Stockgrip, which was introduced in June 2014. It features a more robust fixed-knot which wraps the horizontal wires and the continuous vertical picket, similar to Clipex's Tuff knot. The fence section is favoured for long strains where animal impact is likely, and top and bottom wires are 2.8mm. While the Waratah catalogue lists only the smaller sizes in heights of 700 and 900mm, Kondinin Group engineers observed several fences featuring a 16/180/15 section, which was supplied in 250m rolls. Apparently custom sizes and horizontal spacings are available for large orders. No hinged apron section is fitted, with the 16/180/15 usually mounted at a height of 1500mm, forming a 300mm bent apron on the ground.

Some sections of Waratah Stocklock (ring knot) and Stocktight (hinged knot) can also be used in lower height boundary fences (eg under pressure from pigs). Netting (eg 600mm Longlife) can be used at the base of prefabricated fencing as a replaceable apron, or buried underground.

Many exclusion fences spotted in Queensland utilised a heavy-duty Galstar Maxy post every three to four standard posts. This increases the physical strength of the fence, at a cost lower than using all Maxy posts, which cost roughly twice as much as a standard post. All Waratah posts now feature oval holes to suit the JIO clip-attach system (see Fast fencing research report, *Farming Ahead* 271, August 2014) which speeds up wire attachment considerably. Due to the larger number of holes, there is greater flexibility in mounting locations.

We have heard Waratah will release an all-new latch, or quick-attach post sometime early this year to rival the Clipex post. On the large exclusion fences, it can be difficult to hold up a heavy 1800mm section with ►



**Square knot:** The square knot is also commonly used in prefabricated exclusion fencing, and is found in Whites Wires Stiffstay, Southern Wire Farm Fence, Clipex S-fence and Waratah Stocksafe-T.





Waratah JIO post and clip.



Clipex post and wire.



one hand, while attaching the JIO clip to the post. While the JIO system is undoubtedly quicker and more convenient than hand-twisting wires to posts, we are very interested to see what they come up with.

**Clipex**

Clipex has a range of prefabricated “Tuff Knot” exclusion fencing, manufactured to fit perfectly with its Clipex posts. This fixed-knot range has been recently redesigned with altered spacings, tighter knots and heavier coatings. Clipex recommend its 16/180/15 as

its best performing exclusion fence section due to its features a 2.8mm wire on the top and the fourth from the bottom, which is effectively the bottom wire once the apron has been folded (2.5mm on all other wires). Another popular product is the 14/150/15 Tuffknot, which is all 2.5mm. All fixed knots are made from 2.3mm high tensile wire.

A new range of S-Fence prefabricated wire has been recently introduced, with a square knot made from 2.5mm wire, similar to Waratah’s Stocksafte-T. The 15/145/15 is 1200mm high and the 17/175/15 is 1500mm

high, and both feature a 250mm apron or footer attached at the base on hinged knots. The top wire and bottom wire (where the hinged apron attaches) are 2.8mm wire.

The star of the Clipex range is undoubtedly the quick-attach posts, which make attachment of plain, barbed or prefab fence a breeze (see *Farming Ahead* 271). They are available in standard weight, or ‘Beefy’ heavy duty option, similar to the Waratah Maxy post and Whites Stockpost XL post, in 1800, 2200, 2300, 2450 and 2600mm lengths.



### Southern Wire

Southern Wire offers a large range of Farmfence prefabricated sections with a compact square knot.

The 11/90/15 section is available with a 325mm footer attached to the bottom wire with a hinge knot, allowing it to bend at right angles and hug the ground.

Selected sizes are also available in the "Premier 50" coating, including 2.8mm top and bottom wires, for extended life (a purported 50 year lifespan). All other standard Farmfence sections feature 2.5mm wires.

Its Griplock is better suited to exclusion applications, and is available in a range of tall sizes up to 1900 and 2400mm. No hinged aprons are available on the Griplock range.

While Southern Wire does not have a HD post option, its standard black and galvanised posts are offered in sizes up to 2400mm. There is also a recently developed fast-attach "Rapid" post, with slots similar to the Clipex arrangement, but featuring spring-loaded wires to lock fence wire into the slot. We've only seen them used on a couple of fences so far, and they don't seem to be readily available through Southern Wire resellers as of yet. Stay tuned for an update to our fast fencing article in the near future, where we will put them through their paces.



**Post extension:** Cameron French has designed these nifty post top extensions which pin-lock to the top of an existing steel post to add height. Contact: cfrench\_80@yahoo.com



Southern Wire Rapid post. Photo: Ross Batzloff

### Whites Wires

Whites Rural produces a Stiff Stay feral fence prefab section in 13/90/15, 13/115/15 and 15/150/15 patterns. Top and bottom wires are 2.8mm high tensile, and all wire is heavy galvanised. Horizontal wire spacings are graduated, so they are closer together at the bottom of the fence.

Whites has recently released a heavy duty steel post, the Stockpost XL, to compliment its standard Stockpost range.

The XL post is a valuable option for those looking to improve the physical strength of their barrier fence, and is available in 1800, 2100 and 2400mm lengths.

FA

### Case study

#### Morven cluster

**Name:** Tim Williams

**Location:** Morven, Queensland

**Property size:** 8700ha of 340,000ha cluster

**Fence length:** 45km, 300km total cluster fence

**Fence construction:** 16/180/15 Clipex Tuffknot, barb on top, standard Clipex posts every 8m

**Approximate cost of materials per km:** \$4950 (inc. GST)

### NO FENCE EQUALS NO SHEEP

The decision to be a part of the Morvan cluster was an easy one for Tim Williams of Banff Downs. After erecting an exclusion fence of his own three years prior to the cluster fence construction, Tim had the confidence that it would be a success.

Tim knew he either needed to put up a fence, or get out of sheep due to the carnage inflicted by wild dogs. With the cluster fence finished in January last year, the dogger has only shot 10 to 15 dogs in that time in the entire 340,000ha.

The cluster is made up of 25 landholders and surrounds the small town of Morven,



crossing the highway in three places. Its primary aim was to control dogs and pigs, but also to reduce kangaroo numbers which impose massive grazing pressure.

The cluster picked up about \$900,000 of SWNRM funding, adding around \$600,000 of their own money to complete the purchase of materials for the fence. All landholders on the cluster boundary were responsible for clearing and erecting their own sections, and contributed \$1500 per kilometre to the materials. Landholders inside the cluster not adjacent to the exclusion fence contributed \$1.25 per hectare based on their farm size. Others with smaller lengths of cluster boundary



contributed either per kilometre or per hectare, whichever was the greater amount.

Farmers with a cluster fence on their property are responsible for general maintenance, but all landholders contribute to a major maintenance fund at the rate of \$0.05 per hectare per year. This rate is to be reviewed after three years.

Tim says dogs are now virtually eliminated, but control measures are still kept in place. He now has the confidence to let shorn sheep into paddocks which was previously avoided due to dogs. Another benefit has been the ability to graze goats in other paddocks to control regrowth and woody weeds.



**Case study**

**Tambo cluster**

**Name:** Andrew Turnbull  
**Location:** South Tambo, Queensland  
**Property size:** 7200ha of 300,000ha cluster  
**Fence length:** 10km of 300km total cluster  
**Fence construction:** 15/150/15 Waratah Stocksafe-T with 300mm hinged apron, every 4<sup>th</sup> J10 post a Maxy, 6m spacing.  
**Approximate cost of materials per km:** \$5940 (inc GST)

**TAMBO CLUSTER BRINGS FARMERS TOGETHER**

As one of the several farmers forming the Tambo cluster, Andrew Turnbull is justifiably proud that the entire 300km of exclusion fence was erected in 12 months during a drought.

Along with three neighbours, Andrew personally installed 50km of the fence to control wild dogs, including 10km on his own property, and feels if 90% of the dogs can be excluded, then the problem can be easily managed. In the 18 months since the fence was completed, dog numbers have been slashed, and some cluster members have even noticed koalas returning to



their properties. On nearby Landsdowne station, run by Andrew's brother, lambing percentages have gone from 20% to 66%, in a drought year, once the fence was erected. Tambo cluster farmer Andrew Martin had similar results, going from 7% to 70% after the fence was up. Shooters who were previously killing three dogs a week are now getting just one a month.

A grant from Queensland's South West Natural resource management provided \$2.40 per hectare towards the cost of materials, with landowners contributing \$3.80 per hectare, based on the size of their properties. All labour was contributed in kind. Landowners supplied their own gates and end assemblies. Landowners inside the cluster, with no adjoining barrier fence, were

still required to contribute to the project. Waratah Stocksafe-T prefabricated fence was used, as the Stockgrip product was not yet available.

GST refunds on materials purchased were put into a kitty for future maintenance, but when that runs out, the cluster constitution allows for an upkeep charge of 15 cents per hectare per year to be levied on the landholders.

Andrew is now getting back into sheep, and has embarked on a new internal fencing program to help control the hordes of kangaroos still inside the exclusion fence. He says the benefit to the community is one of the best things to come out of the cluster fence, creating confidence in sheep and lifting spirits of the Tambo farming families.

**Case study**

**Scott McKechnie**

**Location:** 40km SE of St George, Queensland  
**Property size:** 12,000ha  
**Fence length:** 26km  
**Fence construction:** Clipex posts and 15/180/15 Tuffknot prefab (stiff apron)  
**Approximate cost of materials per km:** \$4000 (inc. GST)

**BENEFITS IMMEDIATELY APPARENT IN CROPPING SCENARIO**

Scott McKechnie has been continuously cropping a block he developed three years ago. Due to intense damage from up to 7000 kangaroos, he has been able to harvest grain from some parts of the farm for the first time this year, after the installation of a 26km exclusion fence around most of the boundary in early 2015.

With areas of state forest surrounding the block and native vegetation strips running through it, kangaroo pressure has been intense. Areas of the 12,000ha block have been severely damaged by kangaroos in the previous two years of cropping as dryer conditions to the West prevailed.

The solution for Scott was to invest heavily in an exclusion fence. With the



added incentive of a low-cost Queensland Rural Adjustment Authority (QRAA) loan, Scott now has a strong, impenetrable fence which is helping address the wild dog impact on his cattle enterprise and substantially reducing damage to his crops.

Standard 9-slot Clipex posts have been used in the exclusion fence at 10m spacings with every third post being a Clipex Beefy post for additional strength. In itself, this creates a very strong fence, but to add to this strength, the new exclusion fence is built immediately beside an existing fence with steel posts of old fence spaced between the new posts effectively giving a post every 5m.

Building the fence was initially tricky, but got easier as the job went on with practice

and learning how to handle the fence components. With pickets on a 150mm spacing, the alignment of the picket and the post means the fence can sometimes be difficult to clip. But using a tyre lever to tap the picket to shift it slightly allows the fence to be clipped without too much effort.

The construction process involved driving in the posts with a Christie driver, rolling out the pre-fabricated section, crimp-joining rolls together and clipping the top then bottom wire in before clipping in all the intermediate wires.

Scott estimates the fence should last for at least 50 years with regular maintenance based on the lifespan of the original dog fences in the area when the land was first opened up.



### Case study

#### Nigel and Rosemary Brumpton

**Location:** Mitchell, Queensland

**Property size:** 4,500ha

**Fence length:** 25km

**Fence construction:** Clipex posts and 14/150/15 Tuffknot prefab with one bottom barb and two top barbs.

**Approximate cost of materials per km:** \$7,000 (inc. labour and GST)

### LAMBING LOSSES LEAD TO FENCING INVESTMENT

Suffering heavy stock losses to wild dogs and significant damage to crops from kangaroos, Nigel and Rosemary Brumpton invested in 25km of Clipex Tuffknot fence with a combination of standard and Beefy Clipex posts. The 14-wire pre-fabricated fence also features two top barbs and one bottom barb except where overland water flows. Here, angled support posts and an apron allow flood debris to push out under the fence if needed.

While the fence was self-funded with no federal or state funding support, neighbours were supportive and contributed to the cost of construction,



providing 50% of the cost of a regular boundary fence to the build.

With lambing just finished, the fence installed and a particularly troublesome dog trapped, lambing rates have been noticeably higher this year according to Rosemary. Pressure on cropping country from kangaroos has also been significantly reduced.

Having been a member of a successful five-property cluster bid for a South-West



NRM grant, Nigel is now working with other members of the 242,000ha cluster which will incorporate their other property at Cunamulla.

For those looking to invest in exclusion fencing, Rosemary recommends prompt animal control once the fence is installed to realise the benefits of the investment and suggests considering a regular maintenance plan is essential to ensure its efficacy.

### Case study

#### Ross Batzloff

**Location:** Augathalla, Queensland

**Property size:** 7600ha

**Fence length:** 35km

**Fence construction:** Southern Wire 15/150/15 Griplock with apron, Rapid posts every 6.5m plus drill rods, top barb.

**Approximate cost of materials per km:** \$4700 (inc. GST)

### NEW EXCLUSION FENCE WILL EXPAND OPTIONS

Augathalla farmer Ross Batzloff has just started construction of his exclusion fence, but has no doubt it will work based on the experiences of his neighbours. Ross currently runs cattle but will get back into sheep upon completion of the fence.

A neighbour was one of the first to establish an exclusion fence, which has stood for about 8 years, and makes up about 7km of Ross' boundary. Other neighbours had lambing rates around 10% two years previously, and these have lifted to 95 to 100% thanks to their exclusion



fence. Dogs have only recently become a problem for Ross, who has lost calves to the predators. He has chosen Southern Wire products, and is using the new rapid posts which feature a quick-attach spring clip. A 3m drill pipe is belted in every ten posts to improve fence integrity on the black soil, and the top barbed wire has been recycled from the existing boundary fence which has been pulled down. Access gates, mainly for fire fighting, are being placed every 3km.

Ross estimates three men could put



up 3km of fence a week, including earthworks and removal of the existing fence, constructing all end assemblies and installing gates. The Rapid posts increase the speed of fence erection, and only become a problem when they twist on installation, and the fence must be tied to the post.

Ross is hoping he can also reduce the number of kangaroos on his property from an estimated 8-10,000 down to a manageable 1-2000, which should see an approximate 30% increase in carrying capacity.

**Acknowledgements:** Kondinin Group would like to thank farmers in south western Queensland who were extremely generous with their time and information. In particular, Andrew Turnbull, Tambo; Tim Williams, Morven; Ross Batzloff, Augathalla; Nigel and Rosemary Brumpton, Mitchell; Scott McKecknie, St George; Stuart Mitchell, Bollon, and Paul O'Meehan, Borden. Also thanks to Bruce and Vicky Jones, Mitchell; Stafford Olssen, Clipex; Simon Richardson and Wayne Cunningham, Waratah; Con Calagis, Whites Group.



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