FITZROY BASIN ASSOCIATION

Fact Sheet

Series: Land

The economics of land regeneration

The impact of agricultural run-off on coastal waters is never more apparent than after a large flood, as the sediment plume at the mouth of the Fitzroy River pictured above demonstrates. The effect of contaminants entering waterways and draining to the iconic Great Barrier Reef is just one reason that Fitzroy Basin Association Inc (FBA) works with landholders to help reduce erosion and run-off.

By supporting increased ground cover, healthy pastures and better management, FBA also seeks to help landholders to run more productive and sustainable businesses. Long-term land decline affects economic performance due to a lower carrying capacity and lower productivity.

But is it actually worthwhile from a production standpoint to bring highly degraded land back to good health? To answer this question, a case study for central Queensland was developed to explore the benefits and costs of land regeneration and the viability of such an investment.

Two land types were analysed: brigalow blackbutt; and narrow-leaved ironbark woodlands. Turnoff from these consisted of Jap Ox (with a gross margin of $176 per beast area) and 18 month old store steers (with a gross margin of $149.50 per beast area). A whole property analysis was conducted over 20 years.

The assumptions and results used in the analysis are shown below.

Costs

The cost and prices that were used in the analysis were as follows:

Table 1

Land regeneration costs	Cost ($)	Assumptions on amount used
Deep rip ($/ha)	80.45	Total area in D condition[#]
Buffel seed 1.5 kg/ha @$7.00/kg	10.5	Total area in D condition
Fencing ($/Km)	5,000	1 km for every 100 ha of D condition land
Waters		
Poly pipe/km ($/km)	5,000	1 km for every 100 ha of D condition land
Poly tank ($/per tank)	5,000	Refer to scenarios
Trough ($/trough)	1,200	Refer to scenarios

[#] All reference to D, C and B land conditions refers to QPIFs Stocktake grazing land condition scoring framework.

Brigalow blackbutt

5,000 ha property with four potential areas of declined condition :– 100 ha, 500 ha, 1,000 ha and 2,000 ha

Land regeneration from D – B

All scenarios have assumed the following:

- Year zero – a. Deep ripped re-seed wth buffel grass
  – b. Average rainfall
- Year one – No stock for 12 months
- Year two – Stocked to a D condition stocking rate
- Year three – Stocked to a C condition stocking rate
- Year four – Wet season spelling for six weeks
  – Stocked to a B condition stocking rate
- Years five to twenty – Stocked to a B condition stocking rate.

It was assumed that every 5 years, for four months of the year all areas (with the exception of 100 ha) were stocked at a lighter wet season rate of 75% of B condition stocking rate

Scenarios

Scenario 1

- Entire paddock is being regenerated
- No additional watering points for any area
- No fencing for any area.

Scenario 2

- All areas fenced off using the ratio of 1 km of fencing per 100 ha of land
- Entire paddock removed from production
- Watering points were installed. 500 ha – one watering point installed, 1,000 ha – two watering points installed and 2,000 ha – three watering points installed.

Scenario 3

- Area to be regenerated is a portion of a larger paddock
- No fencing for any area
- Entire paddock removed from production during restoration period
- No additional watering points for any area.

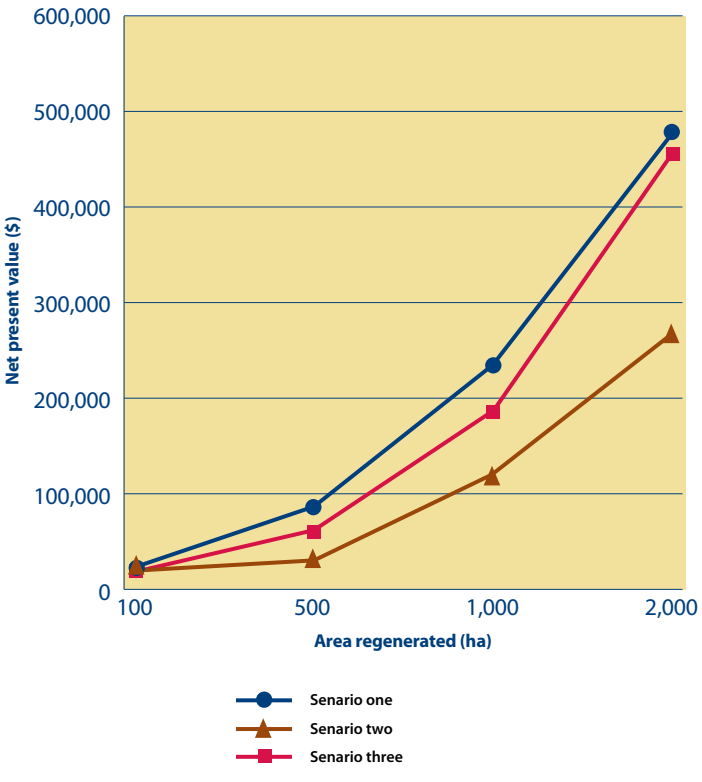
Results

The results of this analysis indicate that for each of the three scenarios modelled the decision to restore land condition from D–B condition for brigalow blackbutt grazing lands increased the economic performance of the representative property by $13,234–$462,726 depending on the hectares being restored, and the need to introduce property infrastructure. To ensure that the land does not decline again due to inappropriate property management planning, the net present value for regenerating 1,000 ha which is a part of a larger paddock is $189,635. This means that the grazier would be $189,635 better off in today's dollar value if the land was regenerated and kept in B condition over the next 20 years. Diagram 1 demonstrates that the larger the area regenerated the greater the return on the initial investment.

Table 2

Area of entire paddock (ha)	1,000	2,000	2,500
Area of paddock in declined condition (ha)	500	1,000	2,000

Diagram 1. Net present values of regenerating brigalow blackbutt from D to B condition



Land regeneration from C – B

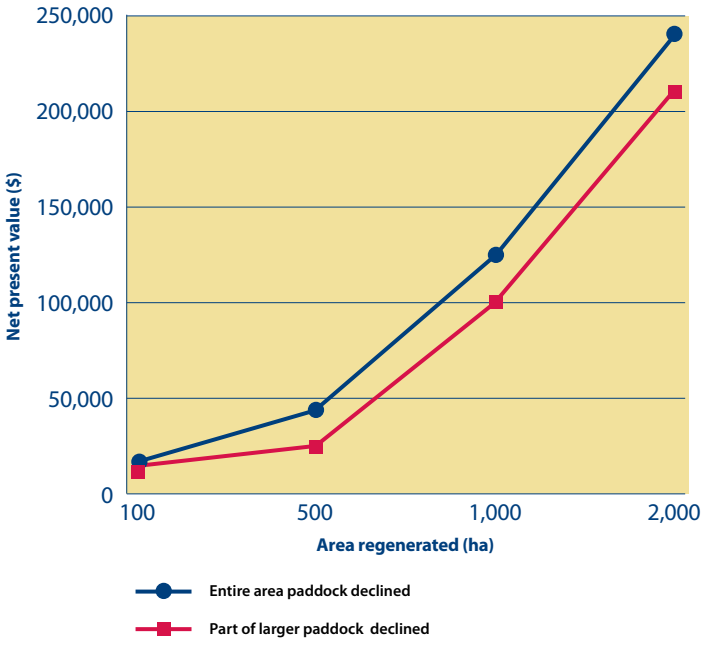
Assumptions for regenerating land from C to B condition were as follows;

- Declined land would regenerate from C condition to B condition within 12 months of no stock on the area in declined land condition.
- It was assumed that every five years, for four months of the year all areas (with the exception of the initial 100 ha) were stocked at a lighter wet season rate of 75% of B condition stocking rate
- No mechanical intervention was required.

Results

The net present values again indicate that the decision to regenerate land from C to B is an economically viable decision. Diagram 2 demonstrates that although the costs associated with regenerating land are lower (the opportunity cost of grazing) the production benefits are also lower, therefore the net present values are not as high as regenerating land from D to B condition.

Diagram 2. Net present values for brigalow blackbutt regeneration from C to B condition



Narrow-leaved iron bark woodlands

10,000 ha property with the areas in declined condition:– 200 ha, 1,000 ha and 2,000 ha

Land regeneration from D – B

All scenarios have assumed the following:

- Year zero – a. Deep ripped re-seed wth buffel grass
  – b. Average rainfall
- Year one – No stock for 12 months
- Year two – Stocked to a D condition stocking rate
- Year three – Stocked to a D condition stocking rate
- Year four – Stocked to a C condition stocking rate
  – Wet season for eight weeks
- Years five to twenty – Stocked to a B condition stocking rate.

It was assumed that every 5 years, for four months of the year all areas (with the exception of 100 ha) were stocked at a lighter wet season rate of 75% of B condition stocking rate

Scenarios

Similar scenarios as brigalow blackbutt were again employed with the addition of the following assumptions:

- Watering points were installed. 500 ha – one watering point installed, 1,000 ha – two watering points installed and 2,000 ha – three watering points.
- It was assumed that 200 ha in every scenario was fenced off using the ratio of 1 km of fencing per 200 ha of land and received no waters, and had no grazing for year zero.
- For scenario two, the ratios in Table 3 were used.

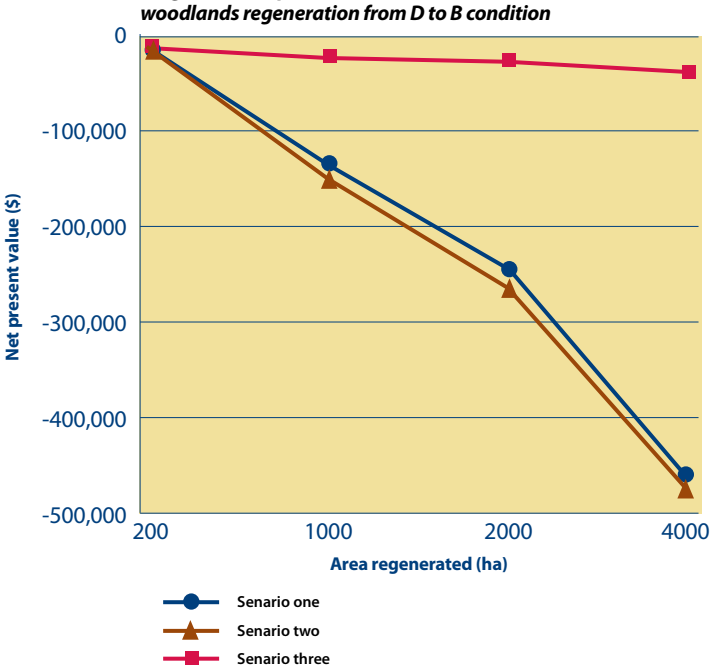
Table 3

Area of entire paddock (ha)	400	2,000	3,000	5,000
Area of paddock in declined condition (ha)	200	1,000	2,000	4,000

Results

The results demonstrate that only for large areas is it a viable investment choice to regenerate land using any of the three scenarios analysed. This is due to the lower gross margin, lower carrying capacity, and longer time period for regeneration associated with narrow-leaved ironbark. Diagram 3 illustrates that when capital infrastructure is implemented (i.e. scenario 3) there is a negative return for each degraded area analysed. The results of this analysis imply there are economic challenges confronting graziers when attempting to restore narrow-leafed ironbark land condition.

Diagram 3. Net present values for narrow-leaved ironbark woodlands regeneration from D to B condition



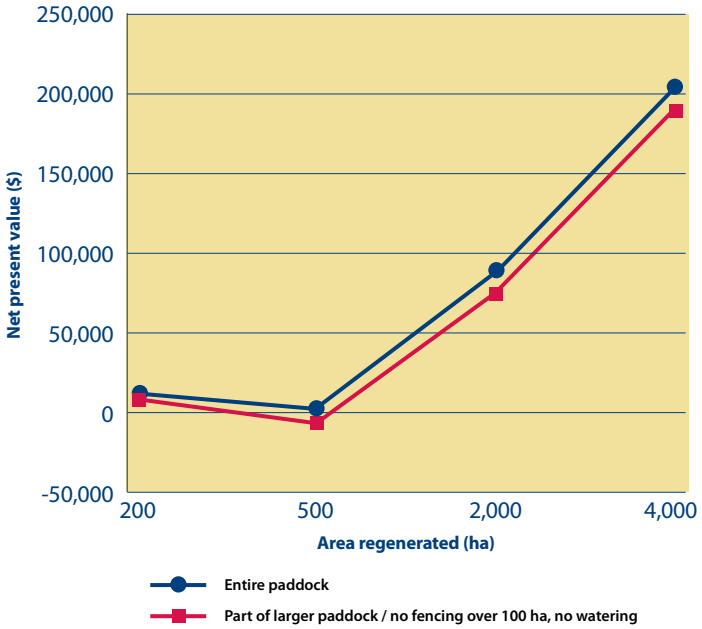
Land regeneration from C – B

Regeneration from C to B followed the same assumptions and scenarios as brigalow blackbutt and is presented in Diagram 4.

Results

As the only costs assumed were the opportunity cost of not having stock on the declined area, the net present value for large areas of declined land condition were positive. This demonstrates that it is a viable option to regenerate land from C condition to B condition for narrow-leaved ironbark woodlands, and particularly viable for large areas of this land type.

Diagram 4. Net present values for narrow-leaved ironbark woodlands regeneration from C to B condition



Conclusion

This analysis demonstrates that land type, carrying capacity and required capital investments are important variables when considering land regeneration. Land which is highly productive such as brigalow blackbutt in D condition or C condition, is a viable investment option to regenerate back to B condition. However, for land that is not as productive, such as narrow-leaved ironbark woodlands, there are economic challenges in regenerating condition from D to B particularly for smaller areas. The only economically attractive strategy is to focus on restoring land from C to B condition in the absence of any incentive payments to offset some of the intervention costs experienced by graziers restoring narrow-leaved ironbark land from D toB condition.

Further information

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