TASMANIAN
LAND
CONSERVANCY

Annual Reserve Report

Vale of Belvoir Reserve 2016-17

www.tasland.org.au

INTRODUCTION

The Tasmanian Land Conservancy (TLC) protects important natural areas as permanent reserves and aims to demonstrate excellence in reserve management for biodiversity conservation. The TLC has adopted an adaptive management framework – the Open Standards for the Practice of Conservation which comprises 6 key steps – planning, implementing, monitoring, reporting, review/adaptation and communication.

The Vale of Belvoir Reserve was acquired by the TLC in 2008 and protects 476 hectares of highland grassland, wetlands and rainforest in the Tasmanian highlands, northwest of Cradle Mountain National Park. The management of the Reserve is guided by the Vale of Belvoir Reserve Management Plan. The plan is implemented by TLC staff through an Annual Work Plan and Monitoring Plan. Details of ecological monitoring methods can be found in TLC's Ecological Monitoring Procedures Manual on www.tasland.org.au.

This report describes progress made towards delivery of the management plan in 2016-17, and is divided into three sections:

1. Reserve Scorecard – a table summarising the results of ecological monitoring to date;
2. Management Summary – providing details of the implementation of key management strategies and making recommendations for plan improvement;
3. Ecological Monitoring Summary – providing details of the status of conservation targets and trends of key ecological indicators

The recommendations made in this report are used to adapt and improve management of the Reserve, update the management plan, and revise work and monitoring plans for the coming year. Key findings of this report are communicated to TLC Board, supporters and other stakeholders.

Cover image: Vale of Belvoir Open Day Feb 2017. Photo: Heath Holden.

VALE OF BELVOIR RESERVE SCORECARD 2016-17

Ecological Monitoring			
Target	***Indicator***	***Status 2015-16***	***Trend***
Highland grassland	Floristic diversity	8.9	No change
	Structural complexity	2.5	No significant change
	Leucochrysum albicans	17.2	Flat
	Stackhousia pulvinaris	20.3	Flat
	Oreixenica ptunarra	Abundant	Flat
Streams and wetlands	Floristic diversity	9.5	No change
	Structural complexity	2	No change
	Water quality - Total nitrogen - Total phosphorous	 1.2 0.12	 Decrease Increase
	Pugging	Most sites	Flat
Highland forest	Floristic diversity	7.4	No significant change
	Structural complexity	4	No change
	Recruitment	2.1	No change
	Extent	47.3	No change
Native wildlife	Total species	11 species	Increase (75%)
	Proportion of native species	83%	Decrease (10%)
	Tasmanian devil - Abundance - Occupancy	 0.23 0.67	 Increase (310%) Increase (20%)
	Eastern quoll - Abundance - Occupancy	 0.17 0.67	 Increase (154%) Decrease (16%)
	Spotted-tailed quoll - Abundance - Occupancy	 0.004 0.08	 Decrease (19%) Increase (14%)
	Wombat - Abundance - Occupancy	 0.81 0.92	 Increase (31%) Decrease (8%)
Management Effectiveness			
Strategy	***Indicator***	***Status 2016-17***	***Trend***
Grazing management	Grazing intensity	0.42 Dry Sheep Equivalent/ha	Decrease
	Grazing timing	January – May	Flat
Fire management	Fire extent (ecological)	0 ha	Decrease
	Fire extent (unplanned)	0	Flat
Weed management	Weed extent	<200m2	Flat
	Weed density	Sparse	Flat
Feral animal management	Wasp abundance	0 observations 0% of sites	Decrease
	Feral cat - Abundance - Occupancy	 0.08 0.25	 No change Increase
	Rabbit - Abundance - Occupancy	 0.04 8% of sites	 Decrease (20%) No change
	Deer occupancy	Present – not captured on	Unknown

		camera	
Visitor management	Condition of reserve infrastructure	Good	Flat
Community engagement	Volunteer days	52 days (Reserves = 12, Open Day = 30, Monitoring 10)	Increase
	No. of visitors	100 +	Increase
	Research and education	3 projects	Flat

MONITORING SUMMARY

HIGHLAND GRASSLANDS	**Status: Very Good** Target is within its natural range of variation
Goal: Maintain the condition and extent of highland grasslands and threatened species	**Outcome: On-track**

Target description:
Highland grasslands are the most extensive and significant conservation feature of the Vale of Belvoir Reserve. The grasslands are home to an outstanding diversity of wildflowers including many threatened species including the grassland paper daisy (*Leucochrysum albicans*), and alpine candles (*Stackhousia pulvinaris).* The grasslands also support an exceptionally diverse fauna, including high populations of native carnivores such as the Tasmanian devil, and grassland specialists such as the ptunarra brown butterfly and tussock skink – both threated species.

Grassland paper daisy. Photo: Heath Holden

Ecological indicator	**Status 2017**	**Status 2016**	**Trend**
Floristic diversity (species per site)	8.9	18.9	No change
Structural complexity (strata per site)	2.5	2.5	No change
Leucochrysum albicans (cm cover per site)	17.2	14	No significant change
Stackhousia pulvinaris (cm cover per site)	20.3	20.4	No significant change
Oreixenica ptunarra (# butterflies/100m transect)	Abundant	Abundant	Flat

Key findings

- Monitoring has demonstrated that the richness and structure of native grassland vegetation has been maintained over the past year. No change was detected in populations of *Stackhousia pulvinaris* and *Leucochrysum albicans*. However, a larger number of monitoring sites will improve our ability to detect changes in populations of these important species ion the future.
- Surveys were undertaken to count Ptunarra brown butterflies during their March flying season, which determined that the species was still present in sites burnt in Sep 2015. Variability in number of butterflies flying over the duration of the flying season makes it difficult to determine specific variation in population size, however, butterflies remain abundant in both burnt and unburnt areas. Tussock skinks were also observed within the burnt area. These surveys are establishing the fire tolerances and requirements of these grassland-dependent species.
- Ecological burning in two areas has resulted in improved species richness after 2-5 years. The floristic diversity of an area burnt in 2012 is approximately 10% higher than in unburnt areas, while a more recent burn in 2015 has rebounded post fire and is on an upward trajectory.
- Research was undertaken to determine the specific effects that the cattle grazing and fire regimes have on grassland diversity and vegetation community composition. Data analysis was completed by Mark Hovenden (UTAS) and identified that species richness was significantly lower, and was sedgier, in areas where disturbance by cattle grazing or burning was absent. The highest species diversity was in areas that were either grazed and burnt, or only burnt. Multi-variate analysis showed that burning had a strong influence on community composition, while grazing had very little influence. A paper presenting these results was given at the NSW Nature Conservation Council's Fire and Biodiversity Conference.

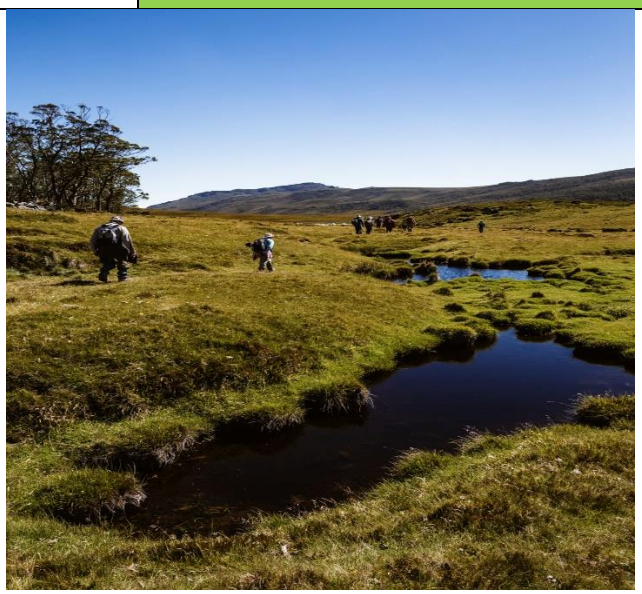
• Funding was provided by Cradle Coast NRM to support on-ground grassland management work and research into best-practice management of highland grasslands.

Recommendations

- Cease cattle grazing at the end of the present lease in June 2018.
- Increase the number of monitoring sites for threatened plants.
- Continue to implement the fire management plan and maintain monitoring focus on burn areas.
- Repeat grassland diversity survey in Jan 2018.
- Prepare a paper to be published on the outcomes of the grassland diversity survey.
- Seek further funding from Cradle Coast NRM to continue the work on best-practice management of highland grasslands.

STREAMS AND WETLANDS	**Status**: **Fair** Significant change is required to improve the viability of this target
Goal: Improve the condition of streams and wetlands	**Outcome: Some progress**

Target description:
The Vale of Belvoir forms the upper catchment of the Vale River, and is scattered with numerous streams and wetlands. Limestone underlies the whole valley and a range of karst features, including caves, sinkholes and outcroppings are scattered across the landscape.



Wetlands abound at the Vale. Photo: Heath Holden

Ecological indicator	**Status 2017**	**2016**	**Trend**
Floristic diversity (species per site)	9.5	8.9	Increase
Structural complexity (strata per site)	2	2	No change
Pugging (proportion of wetlands)	Most unfenced wetlands	Most unfenced wetlands	No change
Water quality (Total N, P) Reference: Site VABE011 Nitrogen 0.43 Phosphorous 0.20	 Site VABE020 N. 1.6 P. 0.12	 Site VABE020 N. 1.7 P. 0.09	 No change Increase

Key findings

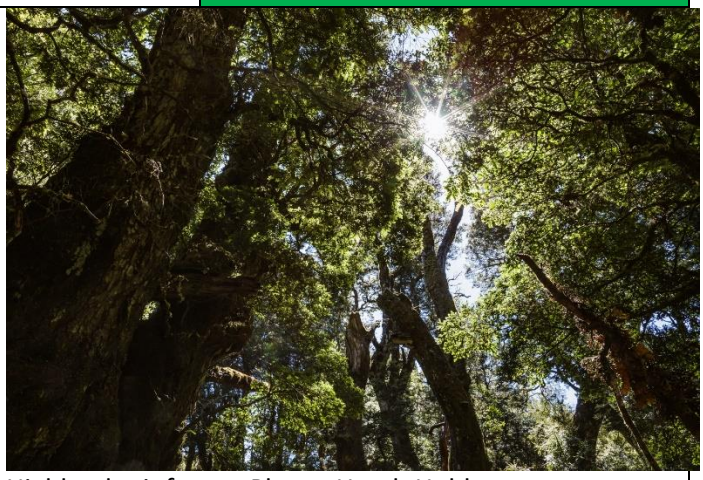
- Monitoring has shown that the diversity of riparian vegetation has improved over the past year. This is probably due to a return to normal weather conditions following an exceptionally dry period.
- Repeat sampling of water and macroinvertebrates were made across the reserve, with the assistance of freshwater ecologist Laurie Davies.
- Pugging and nitrification caused by cattle continue to have a major impact on wetlands across the reserve. While the level of impact varies from wetland to wetland, some wetlands are severely impacted, with nutrient levels up to 4 times higher than reference sites.
- Cattle continue to trample sensitive vegetation types such as sphagnum peatland and riparian vegetation.

Recommendations

- Phase out grazing at the Vale of Belvoir in the short-term
- Continue long-term ecological monitoring of vegetation
- Undertake further water quality monitoring sampling

HIGHLAND FOREST	**Status: Very Good** Target is within its natural range of variation
Goal: Maintain the condition and approximate extent of highland forests	**Outcome: On track**

Target description:
Highland forest occurs on the eastern and western slopes of the Vale of Belvoir. Grassy woodland dominated by cider gum fringes the open grassy valley. These woodlands are exceptionally diverse in terms of flora, and are a hotspot of activity for fauna. Beyond the woodland fringe, fire has created a sharp boundary where the vegetation changes suddenly to closed rainforest dominated by mature myrtle, with a dark but open understorey covered in mosses, lichens and fungi.



Highland rainforest. Photo: Heath Holden

Ecological indicator	Current status	Status 2015	Trend
Floristic diversity (species per site)	7.4	8	No significant change
Structural complexity (strata per site)	4	4	No significant change
Recruitment (cohorts per site)	2.1	2.1	No change
Canopy cover (mean cover score)	5.5	5.4	No significant change

Key findings

- Highland forest vegetation remains in excellent condition
- Forest margins remain a hotspot for wildlife.

Recommendations

- Continue long-term ecological monitoring
- Encourage a research project investigating non-vascular flora

MANAGEMENT EFFECTIVENESS SUMMARY

GRAZING MANAGEMENT

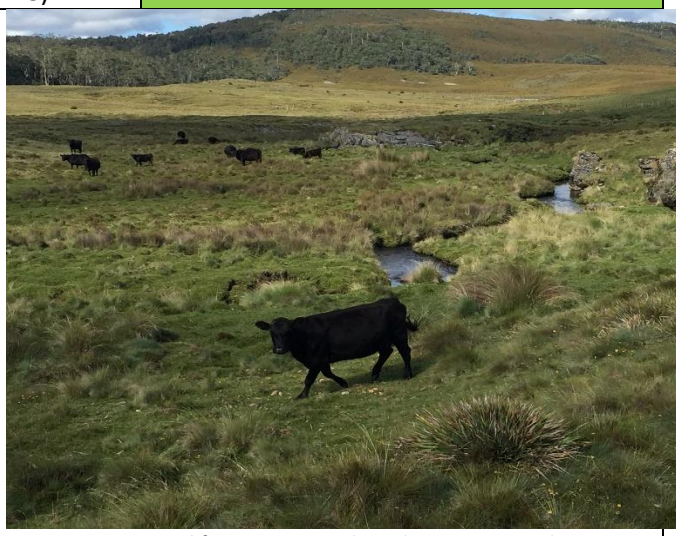
Key objective(s)

- Assess the impact of cattle grazing on the Vale's biodiversity.
- Manage grazing in accordance with lease arrangements.
- Maintain good relationships with the graziers (the Charleston family) and the grazing lessee (PWS).

Status 2016-17
On-track

Strategy description

There has been a long history of cattle grazing at the Vale of Belvoir and grassland ecologists have suggested that grazing may have helped maintain grassland diversity, by preventing grass species from outcompeting herbs and other minor species. Following the Reserve's acquisition, the TLC has continued to graze cattle under a lease arrangement with the previous owners and the PWS, while the effects of grazing on biodiversity values are determined.



Gates and fences o control stock movement. Photo: TLC.

Indicator	Current status	Trend
Grazing intensity	0.42 Dry Sheep Equivalent/ha	Decrease
Grazing timing	January – May	Flat

Progress in 2016-17

- The historic grazing regime was maintained in accordance with the lease arrangements. Cattle numbers were slightly lower than previous years (92 cattle + 16 calves). Total grazing area was restricted to areas not burnt in Sep 2015, which was the same as the previous summer. The resulting grazing intensity per hectare was approximately 60% of that in 2015-16 (Dry Sheep Equivalent/ha = 0.41 in 2016-17, compared to 0.63 in 2015-16).
- Species richness data was analysed to examine the effects of the various combinations of grazing and burning, or their absence on grassland diversity and vegetation community composition. Data analysis by Mark Hovenden (UTAS) identified that species richness was significantly lower, and was sedgier, in areas where disturbance by cattle grazing or burning was absent. The highest species diversity was in areas that were either grazed and burnt, or only burnt. Multi-variate analysis showed that burning had a strong influence on community composition, while grazing had very little influence. A paper presenting these results was given at the NSW Nature Conservation Council's Fire and Biodiversity Conf.
- Cattle grazing will be phased out at the end of the current grazing lease (ending June 2018).
- TLC continued good relationships with the Parks and Wildlife Service and the Charleston family.
- Funding was provided by Cradle Coast NRM to support on-ground grassland management work and research into best-practice management of highland grasslands.

Key recommendations for future management

- Phasing out grazing should be managed sensitively given the cultural significance of cattle grazing at the Vale of Belvoir. Maintaining a good relationship with the Charleston family is a priority.

- Communicate the findings of monitoring and research to stakeholders including relevant experts, conservation professionals, TLC supporters and the wider community. Publish findings in a peer reviewed scientific journal.
- Continue the ecological burning program to ensure that an appropriate disturbance regime maintains the conservation values especially grassland floristic diversity and threatened species.
- Continue to take a precautionary approach by monitoring the Reserve annually, so that any potential adverse effects associated with grazing cessation are identified quickly. Particular focus should be on disturbance regimes, the role of fire in maintaining diversity, and threatened species population dynamics.

FIRE MANAGEMENT

Key objective(s)

- No unauthorised fires occur on the reserve (ongoing)
- Ecological burns are used to maintain floristic diversity of grasslands

Status 2016-17
On-track

Strategy description

Fire has been an important ecological process at the Vale of Belvoir for thousands of years. The burning practices of aboriginal people and then graziers are largely responsible for the extent and condition of today's grasslands. Cool burns at the end of winter maintain the openness of grassy vegetation, which enables herbs to thrive. Fires also prevent the encroachment of trees and shrubs into grassland areas. The TLC contracted two expert fire ecologists to prepare an ecological fire management strategy in 2013, and began implementing a program of ecological burning in 2014, with the aim of maintaining the diversity and extent of grasslands.

Ecological grassland burn at the Vale of Belvoir. Photo: Denna Kingdom

Indicator	Current status	Trend
Fire extent (ecological)	0 ha	Decrease
Fire extent (unplanned)	0	Flat

Progress in 2016-17

- A burn was planned for Sep /Oct 2016 but did not go ahead due to poor weather conditions.
- Fuel load data collected in Jan 2016 was analysed to determine the effect that cattle grazing has on grassland fuel loads. The results of this analysis suggest that cattle grazing has a small effect on reducing fuel loads. Fire initially has a large effect on fuel loads, however this is likely to decrease as the period since fire increases.
- TLC continues to maintain good relations with the PWS, which is important given that planned burns use natural boundaries, such as drainage lines or ridges, that are relatively unsecure and can result in burns extending beyond the planned burn area into the PWS managed Vale of Belvoir Conservation Area.
- There were no unauthorised fires on the Reserve in 2016-17.
- A fire risk assessment was completed for all TLC reserves.
- A fire management policy for all TLC Reserves is being implemented.
- A fuel stove only policy is being implemented, except at Charleston's hut, where a wood-burning stove was installed in 2015 to replace an open fireplace.

Key recommendations for future management

- Prepare ecological burn plans for areas to be burnt in 2017-18 or later.
- Continue the monitoring program around ecological burning and cattle grazing.
- Ensure several monitoring sites are in each planned burn area.
- Ensure that regulatory permits for burning are requested 6 – 12 months before the planned burn timeframe, to ensure that permits are received in sufficient time.

WEED MANAGEMENT

Key objective(s)

- Control existing infestations of scotch thistle.
- Prevent establishment of other weed species.

Status 2016-17
On-track

Strategy description
The Reserve is largely free of weeds. There are isolated patches of Scotch thistle, but these pose minimal threat to the natural values and are a low priority for management. Gorse, broom, blackberry, foxglove and ragwort occur in the local area and pose a more serious threat to the values. Ongoing monitoring will minimise the risk of these weeds becoming established.

Bare ground exacerbates weed invasion. Photo: Matt Taylor

Indicator	Current status	Trend
Weed extent	<200m2	Flat
Weed density	Sparse	Flat

Progress in 2016-17

- Several spear thistle populations were treated by a volunteer in late January.
- Dense infestations of spear thistles were observed in burnt areas of buttongrass, where the density of buttongrass results in bare ground beneath the buttongrass. This bare ground is exposed after a fire, however the buttongrass should rapidly regrow and shade out the thistles. No thistles were observed in burnt Poa grassland or sedgy Poa grassland vegetation communities.
- A small population of ragwort (*Senecio jacobaea*) was identified at the Vale of Belvoir in March. This population co-occurred with a native *Senecio* species, making identification difficult. Ragwort plants were hand pulled; follow-up control will be required. The population was in the middle of the valley, approximately 2km north of the Link Road and did not occur near a cattle camp. This suggests that the seed was blown in on warm dry northerly or north-westerly winds.

Key recommendations for future management

- Use volunteers skilled in ragwort identification to conduct widespread searches for ragwort and control any individuals located.
- Continue to monitor for other priority weeds species.
- Update weed mapping.

FERAL ANIMAL MANAGEMENT

Key objective(s)

- Monitor the impact of European wasps on ptunarra brown butterflies and undertake control if required.
- Determine whether cats, rabbits and deer present a significant threat to natural values.

Status 2016-17
Minor issues

Strategy description

European wasps have been recorded preying on endangered ptunarra brown butterflies near the Vale of Belvoir, where butterfly populations have subsequently crashed. PhD research investigating the specific impact of European wasps on ptunarra brown butterfly populations, may provide management clues. It is likely that, if wasps are present in high numbers, then active wasp control during March when adult ptunarra brown butterflies are emergent, may reduce their impact on this species.

Cats present a serious threat to native animals although in relatively low numbers. Rabbits are also in low numbers, and fallow deer scat was observed for the first time in 2016.

Fallow deer scats at the Vale. Photo: Matt Taylor.

Indicator	Current status 2016-17	Trend
Wasp abundance	0 observations 0% of sites	Decrease
Cat occupancy	Change from 17% to 25% of sites	Increase
Rabbit occupancy	8% of sites	Flat
Deer occupancy	Scats detected – no measures	Unknown

Progress in 2016-17

- Wasps were surveyed during ptunarra brown butterfly surveys, with no individuals or nests observed.
- Fauna monitoring has shown that cats and rabbits are in low numbers and that cats are being detected at more sites.
- Deer scats were observed for the first time at the Vale of Belvoir in 2016 but no measures of abundance are available as yet.

Key recommendations for future management

- Continue to investigate options for European wasps.
- Continue to search for and destroy any wasp nests found. Collect data on the location and number of wasp nests controlled, to monitor changes in the relative abundance and distribution of wasps. If wasp numbers are found to be increasing then a systematic search for wasp nests should be considered.
- Continue to monitor feral cats, rabbits and deer.

COMMUNITY ENGAGEMENT

Key objective(s)

- TLC provides opportunities for the community to connect to the reserve through visitation, volunteering, research and education

Status 2016-17
On-track

Strategy description

People are encouraged to visit the Vale of Belvoir for a variety of low-impact recreational activities including walking, wildlife viewing, trout fishing and photography. Pets, hunting and off-road vehicles are not permitted. Volunteers contribute to the management and monitoring of the reserve and wide range of scientific research projects have been facilitated at the Vale, as a fantastic natural laboratory for the study of ecology and conservation.

TLCs Phil Roach and volunteers at the Open Day Feb 2017. Photo: Heath Holden

Community indicator	Current status	Trend
Volunteer days	52 days (Reserves = 12, Open Day = 30, Monitoring 10)	Increase
No. of visitors	100 +	Increase
Research and education	3 projects	Flat

Progress in 2016-17

- An Open Day was held at the Vale of Belvoir in February 2017, with over 100 people attending.
- Teams of volunteers collected ecological monitoring over the course of three field trips and analysed fauna images. 15 volunteers contributed 30 volunteer days during the 2017 open day.
- Botanists and UTAS researchers continued investigating best-practice management of highland grasslands, and a paper presented at NSW Nature Conservation Council's Fire & Biodiversity Conf.
- Volunteers assisted with ptunarra brown butterfly surveys
- Students from University of Melbourne visited the Reserve for a two week intensive field course.
- Numerous people visited the reserve for recreation, with 15 entries into the Visitors Book at Charlestons Hut. Vandalism, rubbish dumping and anti-social behaviour led to a decision made with the Charleston's to install a locked gate on the track down to the hut, to limit inappropriate use. A sign will welcome walkers and provide information about the hut and its history.
- The Cradle Coast NRM board visited the Vale of Belvoir on a field trip, with TLC presenting a talk on the work TLC has undertaken that has been funded by CCNRM grants.
- Threatened Plants Tasmania continued their monitoring of threatened *Prasophyllum tadgellianum*, led by Phil Collier and a presentation about fire management at the Vale of Belvoir was given to the Australian Plant Society (Tasmania) community group.
- Illegal vehicle tracks near Lake Lea were closed by PWS. A significant increase in use of the Lake Lea campsite area may result in damage to TLC's land, due to toilet waste, rubbish and fires.

Key recommendations for future management

- Continue to maintain relationships with neighbours.
- Record entries in the visitor book at the Charleston's hut to monitor ad hoc visitor numbers.
- Monitor the impacts of visitor use at the Lake Lea campsite; maintain discussions with PWS and deal with any issues that may impact natural values or TLC land.
- Continue to encourage community connections to the reserve by providing opportunities for research, education, recreation and volunteering.