TASMANIAN
LAND
CONSERVANCY

Annual Reserve Report

Vale of Belvoir Reserve 2015-16

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INTRODUCTION

The Tasmanian Land Conservancy (TLC) protects important natural areas as permanent reserves and aims to demonstrate excellence in reserve management for biodiversity conservation. To achieve this aim, the TLC has adopted an adaptive management framework – the Open Standards for the Practice of Conservation. The framework 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.

This report describes progress made towards delivery of the management plan in 2015-16, 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: Grassland, woodlands and wetlands at the Vale of Belvoir. Photo: Matt Newton.

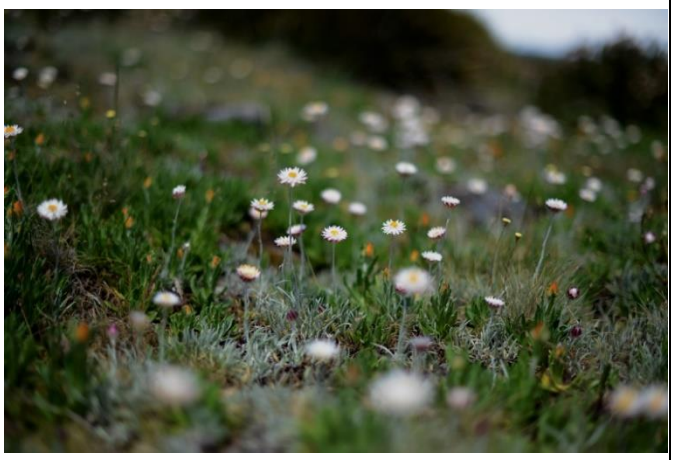
VALE OF BELVOIR RESERVE SCORECARD

Monitoring			
Target	***Indicator***	***Status 2015-16***	***Trend***
Highland grassland	Floristic diversity	8.9	Decrease (15%)
	Structural complexity	3	Flat
	Leucochrysum albicans	14	Flat
	Stackhousia pulvinaris	20.4	Flat
	Oreixenica ptunarra	Abundant	Flat
Streams and wetlands	Floristic diversity	9.5	Decrease
	Structural complexity	2	Flat
	Water quality	Waiting on data	Baseline
	Pugging	Most sites	Flat
Highland forest	Floristic diversity	8	No significant change
	Structural complexity	4	No significant change
	Canopy cover	5.4	Flat
	Recruitment	2.1	Flat
	Extent	47.3	Flat
Native wildlife	Total species	18 species	Decrease
	Richness per site	8.25	Increase
	Proportion of native species	95%	Increase
Community connection to landscape	# volunteer days on the Reserve	23	Flat
	# visitors to the Reserve	16	Flat
	# research and education projects	3	Flat
Management Effectiveness			
Strategy	***Indicator***	***Status 2015-16***	***Trend***
Grazing management	Grazing intensity	0.63 Dry Sheep Equivalent/ha	Slight increase
	Grazing timing	January – June	Flat
Fire management	Fire extent (ecological)	27 ha	Increase
	Fire extent (unplanned)	0	Flat
Weed management	Weed extent	<200m2	Flat
	Weed density	Sparse	Improving
Feral animal management	Wasp abundance	7 observations 20% of sites	Increase
	Cat occupancy	17%	Flat
	Rabbit occupancy	8% of sites	Small increase
	Deer occupancy	Present – not captured on camera	Unknown
Waste water treatment	Treatment system installed?	No	
Visitor management	Condition of reserve infrastructure	Good	Flat
Community engagement	# events at the Reserve	2	Flat
	# of volunteer activities at the Reserve	6	Increase

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.



Vale wildflowers. Photo: TLC

Ecological indicator	**Status 2016**	**Status 2015**	**Trend**
Floristic diversity (species per site)	8.9	10.5	Decrease (15%)
Structural complexity (strata per site)	2.5	2.5	Flat
Extent (hectares)	391	391	Flat
Leucochrysum albicans (cm cover per site)	21.8	14	No significant change
Stackhousia pulvinaris (cm cover per site)	28.7	20.4	No significant change
Oreixenica ptunarra (# butterflies/100m transect)	Abundant	Abundant	Flat

Key findings

- Monitoring has shown that grassland diversity has decreased in the past year. The most likely explanation for this trend is the exceptionally dry conditions that preceded monitoring. Natural annual variability of this magnitude is to be expected.
- No change detected in populations of *Stackhousia pulvinaris* and *Leucochrysum albicans*. Power analysis has indicated that more monitoring sites are needed to reliably detect change especially in *L. albicans*.
- 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 burn area. This is excellent news! There was some uncertainty about the response of these species to fire, because little research has been conducted to date.
- Grassland diversity declined by 35% in response to the September 2015 burn. This short-term effect was expected as it takes time for many species to re-establish post- fire. Diversity also declined following the 2012 burn, but is now equal to unburned areas. We expect it will continue to increase and soon exceed unburnt areas.
- 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.
- Analyse data collected to determine the varying effects of grazing and burning on grassland diversity.
- Consider adding a 'Native wildlife' as a new target, recognising that most terrestrial vertebrates utilise all of the existing physical targets, and allow annual reporting on data being collected through the long-term

ecological monitoring.

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.

'The Octopus' Garden' mineral spring. Photo: TLC

Ecological indicator	Current status	Status 2015	Trend
Floristic diversity (species per site)	8.9	10.5	Significant decrease
Structural complexity (strata per site)	2	2.2	Flat
Pugging (proportion of wetlands)	Most unfenced wetlands	Most unfenced wetlands	Flat
Water quality (TRCI macroinvertebrate index)	**Site / AUSRIVAS / EPT** VABE026/Band C/0.154 VABE011/Band C/0.154 VABE102/Band C/0.231 VABE020/Nil/ 0.000	No data	Baseline

Key findings

- Monitoring has shown that the diversity of riparian vegetation has decreased in the past year. As with highland grasslands, the most likely explanation for this trend is the exceptionally dry conditions that preceded monitoring.
- Observations show that pugging by cattle has affected the majority of wetlands across the Reserve. The impact ranges from moderate to severe, and some wetlands are in extremely degraded condition.
- Cattle are affecting water quality. Pugging and the presence of trout cause increased turbidity in streams and wetlands. Cattle urine and faeces is also being deposited in large quantities into the wetlands.
- Cattle are trampling and defecating on sensitive vegetation and their impact on sphagnum peatland remains a concern.
- Water samples were collected at 6 sites in April 2016 and tested for macro-invertebrates and physico-chemical parameters but showed inconclusive results in relation to cattle grazing. Further testing was recommended.

Recommendations

- Phase out grazing at the Vale of Belvoir in the short-term
- Continue long-term ecological monitoring of vegetation
- Implement the improvements to water quality monitoring recommended in 2016

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: TLC

Ecological indicator	Current status	Status 2015	Trend
Floristic diversity (species per site)	8	9.2	No significant change
Structural complexity (strata per site)	4	5.1	No significant change
Recruitment (cohorts per site)	2.1	2.1	Flat
Canopy cover (mean cover score)	5.4	5.5	Flat
Extent (hectares)	65.2	65.2	Flat

Key findings

- The diversity of vascular plants in eucalypt woodlands is exceptionally high. Rainforests are low in vascular plant diversity, but may be high in bryophyte and fungi diversity.
- Forest areas are a hotspot for wildlife.
- Vegetation is in excellent condition.

Recommendations

- Continue long-term ecological monitoring
- Encourage a research project investigating non-vascular flora
- Consider adding “Native wildlife” as a new target, recognising that most terrestrial vertebrates utilise all of the existing physical targets, and allow annual reporting on data being collected through the long-term ecological monitoring.

COMMUNITY CONNECTION WITH THE LANDSCAPE	Status: Very Good
Goal: People visit the Reserve every year for recreation, research and volunteering	**Outcome: On track**

Target description:
The Vale of Belvoir Reserve provides the community with a range of recreational, educational, research and volunteering opportunities. Volunteers have made a fantastic contribution to TLC's long-term ecological monitoring and conservation research programs over the past year. The Vale has a long history of cattle grazing and the TLC maintains a good relationship with the previous owners who maintain strong ties to the place.

Volunteers monitoring threatened wildflowers. Photo: TLC

Community indicator	Current status	Trend
Volunteer days	23 volunteer days	Small decrease
No. of visitors	26 +	Unknown
Research and education	3 projects	Flat

Key findings

- Teams of volunteers collected ecological monitoring over the course of three field trips and analysed fauna images.
- Volunteers helped with planning and conducting TLC's first ecological burn.
- Expert botanists and volunteers investigated the interaction of cattle grazing and fire on grassland diversity.
- Students from University of Melbourne again visited the Reserve for a two week intensive field course.
- Threatened Plants Tasmania continued their surveys of threatened orchid species.
- Numerous people visited the reserve for recreation, with some writing entries into the Visitors Book at Charlestons Hut.

Recommendations

- Develop a system for recording reserve visitation.
- Continue to encourage community connections to the reserve by providing opportunities for research, education, recreation and volunteering.
- Consider removing this from individual reserve management plans and reporting all relevant TLC activities across Tasmania in a separate report. This approach will be easier to report, more reflective of changes over time, and is a goal of TLC's Strategic Plan.

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 (Parks and Wildlife Service).

Status 2015-16
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.

Grazed (right) and ungrazed (left) highland grassland, previously burnt in 2012. Photo: Denna Kingdom.

Indicator	Current status	Trend
Grazing intensity	0.63 Dry Sheep Equivalent/ha	Slight increase
Grazing timing	January – June	Flat

Progress in 2015-16

- The historic grazing regime was maintained in accordance with the lease arrangements. Cattle numbers were similar to previous years (130 cattle + 40 calves) but grazing was restricted to the area not burnt in Sep 2015. This reduced the grazing area from 900 ha to 750 ha, resulting in a slightly higher grazing intensity per hectare (Dry Sheep Equivalent/ha = 0.63 in 2015-16, compared to 0.53 in 2014-15).
- Species richness data was collected to examine the effects of the various combinations of grazing and burning, or the absence of these, on the diversity of the grasslands. This data will be analysed in 2016.
- Cattle grazing will be phased out at the end of the current grazing lease (ending June 2018).
- TLC continued to maintain 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 should be 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.
- Implement the ecological burning program to ensure that an appropriate disturbance regime is present that maintains the conservation values of the Reserve, in particular 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 immediately. Particular focus should be on disturbance regimes, the role of fire in maintaining diversity, and threatened plant 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 2015-16
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: Heath Holden.

Indicator	Current status	Trend
Fire extent (ecological)	27 ha	Increase
Fire extent (unplanned)	0	Flat

Progress in 2015-16

- A planned burn was undertaken in Sep 2015 during optimal weather conditions, with 27 ha of grassland burnt by a cool, patchy burn.
- Fuel assessments were conducted by Denna Kingdom in Jan and Mar 2016 to assist in the identification of areas to burn in the future, and to assess the effect of cattle grazing on grassland fuel loads.
- 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 2015-16.
- 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 2016-17 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 2015-16
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.

Burnt buttongrass exposes bare ground, where spear thistles were observed growing. Photo: Denna Kingdom

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

Progress in 2015-16

- Occasional thistles and exotic grasses are scattered over the property but currently don't present a threat to the natural values.
- Weeds are more prevalent in areas where cattle grazing intensity is higher, especially at cattle 'camps'.
- 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.
- No new weed species were identified in the Vale of Belvoir, although isolated, small populations of ragwort were observed and controlled alongside the road at Leary's Corner.

Key recommendations for future management

- Continue to monitor for priority weeds species such as ragwort
- Update weed mapping

FERAL ANIMAL MANAGEMENT

Key objective(s)

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

Status 2015-16
Minor issues

Strategy description

European wasps have been recorded preying on endangered ptunarra brown butterflies in areas nearby to the Vale of Belvoir, where butterfly populations have subsequently crashed. Postgraduate research is currently being undertaken by Josephine Potter to quantify the specific impact that European wasps have on ptunarra brown butterfly populations, and to determine how well wasp control measures limit the impact of the wasps. It is likely that, if wasps are present in high numbers, undertaking active wasp control during March when adult ptunarra brown butterflies are emergent, will restrict the impact that wasps have on this species.

Cats present a serious threat to native animals. At the Vale of Belvoir cats are in relatively low numbers. Rabbits are also in low numbers, while deer scat was observed for the first time in 2016.

A wasp trap set at nearby Surrey Hills grasslands. Photo: Jo Potter.

Indicator	Current status	Trend
Wasp abundance	7 observations 20% of sites	Increase
Cat occupancy	17%	Flat
Rabbit occupancy	8% of sites	Small increase
Deer occupancy	Present – not captured on camera	Unknown

Progress in 2015-16

- Wasps were surveyed during ptunarra brown butterfly surveys, with 7 individuals observed in total, across 30 transects. Two wasp nests were located in 2016, although control using permethrin dust was not possible due to the nests being inaccessible.
- Fauna monitoring has shown that cats and rabbits are in low numbers and do not constitute a threat to the targets at present.
- Deer scats were observed for the first time at the Vale of Belvoir in 2016.

Key recommendations for future management

- Investigate the use of meat baits to control 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

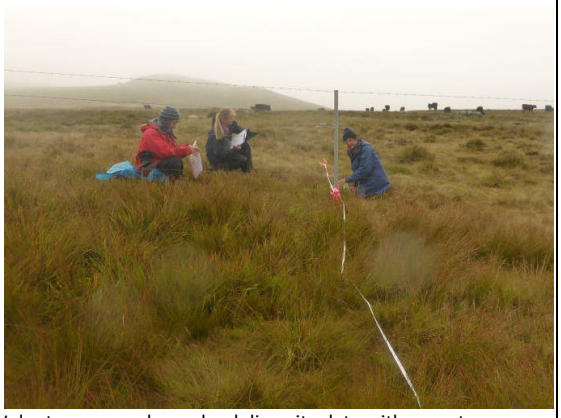
Key objective(s)

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

Status 2015-16
On-track

Strategy description

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



Volunteers record grassland diversity data with expert botanists. Photo: Viv Muller.

Indicator	Current status	Trend
# events at the Reserve	2 events (1 cancelled due to nearby fires)	Decrease
# of volunteer activities at the Reserve	6 volunteer activities	Increase

Progress in 2015-16

- Volunteers assisted with 5 monitoring and management trips.
- An Open Day scheduled for January 2016 was cancelled at short-notice due to fires in the area. Many supporters who registered for the Open Day subsequently visited the Vale of Belvoir independently; another supporter trip was undertaken at the Vale of Belvoir in Oct 2015.
- 39 people recorded their visits in the visitor book at Charleston's hut.
- The community group Threatened Plants Tasmania continued their monitoring of threatened *Prasophyllum tadgellianum* at the Vale of Belvoir, led by Phil Collier.
- A French film crew, supported by Bonorong Wildlife Sanctuary, filmed at the Vale of Belvoir with a focus on searching for thylacines.
- Illegal vehicle access was detected coming from the PWS managed Vale of Belvoir Conservation Area, near Lake Lea and Vandalism, rubbish dumping and anti-social behaviour was noted in the Visitors Book several times.
- Toni Furlong NRM North assisted with water quality testing

Key recommendations for future management

- Continue to provide opportunities for people to connect with the Reserve.
- Continue to maintain relationships with neighbours.
- Record entries in the visitor book at the Charleston's hut to monitor ad hoc visitor numbers.
- Discuss with PWS ways to prevent vehicle access from the Lake Lea Track.
- Discuss with the Charleston family ways to reduce vandalism and anti-social behaviour by visitors to Charleston's hut.
- Consider dividing this strategy into "community engagement" and "visitor management", with community engagement reported across all of TLCs activities in a separate report. This approach will be easier to report, more reflective of changes over time, and a goal of TLC's Strategic Plan.
- Consider dividing this strategy into "community engagement" and "visitor management", with the community engagement section to be reported across all of TLCs activities across Tasmania in a separate report. This approach will be easier to report, more reflective of changes over time, and is a goal of TLC's Strategic Plan.