# **Victorian Semi-arid Woodlands**

Annual Monitoring: Hattah-Kulkyne & eastern Murray-Sunset

Monitoring program update May 2025



## **Key Messages**

- Ongoing control of browsing herbivores is important for the recovery of grazing-sensitive, slow-growing Semi-arid Woodlands.
- Semi-arid Woodland Condition Monitoring over 12-years (2012-2024) shows:
  - > Limited browsing impacts on tree recruitment.
  - > An improvement in woodland condition at 13 of 20 sites in eastern Murray-Sunset.
  - > Minimal change in woodland condition at 40 sites in Hattah-Kulkyne.
  - > Tree life stage distribution is slowly improving.
- This highlights positive progress towards woodland recovery. However, most woodlands are still in poor condition. Ongoing browser control and targeted revegetation will ensure long-term woodland viability.

### Semi-arid Woodlands

Semi-arid woodlands are characterised by one or more canopy species – Belah (*Casuarina pauper*), Buloke (*Allocasuarina luehmannii*), Slender Cypress Pine (*Callitris gracilis*), and Sugarwood (*Myoporum platycarpum*) – over a diverse ground layer of saltbushes, herbs, grasses and biological soil crust.

### Management and monitoring long-term recovery

Victoria's Semi-arid Woodlands are severely degraded due to historical land use. They are slow-growing and reliant on high rainfall events to enhance regeneration. Woodland recovery is slow and impeded by browsing. Thus, historical and current ecological impacts (e.g. grazing, altered fire regimes) have long-lasting impacts on condition. To improve woodland condition, a long-term restoration program (The Total Grazing Management Plan – Parks Victoria 2017 & 2025) has been running for over 10 years. In addition to this, the Semi-arid Woodland Condition Monitoring Program is being implemented to enhance management effectiveness, measure recovery success and improve our knowledge base.

### **Annual Monitoring**

This monitoring program update provides a summary of the findings of the 2024-2025 monitoring of 60 sites across Hattah-Kulkyne and eastern Murray-Sunset National Parks. These sites are part of a broader suite of 300 sites across the Mallee National Parks. It investigates changes in woodland condition states (poor, fair, good) over three monitoring periods (2012, 2018, 2024) across a 12-year period (2012-2024).



Belah woodland in poor (left), fair (middle) and good (right) condition in 2024.





Healthy People'



OFFICIAL

## Hattah-Kulkyne

Forty sites were monitored in Hattah-Kulkyne National Park (map on the right). Historically Hattah-Kulkyne has been heavily cleared and grazed by stock. This is currently reflected in the poor condition of Semi-arid Woodlands with low tree numbers (across all life stages), limited tree and shrub recruitment and the overall slow recovery of these woodlands.

### **Main Findings**

- Over a 12-year period, three of 40 sites improved in condition (two from poor to fair, and one from fair to good). However, three other sites declined in condition (fair to poor). Thus, table numbers reflect both increases and declines in condition. However, some individual attributes have improved (e.g. increase in healthy trees).
- Limited evidence of browsing impacts on tree recruits.



- Tree recruitment (mostly Slender Cypress Pine) occurred in 23% to 45% of sites, but numbers are low and insufficient to maintain population viability. All Belah and Slender Cypress Pine recruitment was natural, while Buloke and Sugarwood were a mix of natural recruitment (M1 to M3) and revegetation (M2, M3).
- Tree life stage distribution (demographic condition) is slowly improving with young trees present and limited decline in healthy mature trees. The condition of Belah, Buloke and Slender Cypress Pine woodlands has remained stable.
- Understorey vegetation condition is variable over time. Large shrub richness has showed small improvements, while native species richness and weed cover have fluctuated over the 12-year period.

Condition attribute		M1 (2012)			M2 (2018)			M3 (2024)		
(# sites)	Poor	Fair	Good	Poor	Fair	Good	Poor	Fair	Good	
SAW condition state	26	14	0	26	13	1	27	12	1	
Tree life stage distribution	25	12	3	25	12	3	27	7	6	
Large shrub richness	4	40		38		2	37		3	
Native plant richness	4	40		19		21	33		7	
Weed cover	7	6	27	3	18	19	2	8	30	



Slender Cypress Pine woodland site at Hattah-Kulkyne highlighting the importance of browser control through the growth of Slender Cypress Pines between 2012 (left), 2018 (centre) and 2024 (right).

#### **Management Implications**

Active revegetation works are required in combination with ongoing herbivore browsing control to improve woodland condition. Without active revegetation woodland condition is unlikely to improve. Revegetation works should be undertaken at key sites targeting those in fair condition, and Buloke and Slender Cypress Pine woodlands. Works should involve interplanting of medium to large shrubs, small trees and canopy trees. A rapid response to bushfires, when they occur, to limit negative impacts to Semi-arid Woodlands is required as this plant community is fire sensitive.

## **Eastern Murray-Sunset**

Twenty sites were monitored in eastern Murray-Sunset National Park (map on the right).

Eastern Murray-Sunset has been variably grazed but generally not cleared in its pastoral history. This is reflected in the fair to good condition of Semi-arid Woodlands with reasonable tree numbers (across all life stages), variable tree and shrub recruitment and the overall slow recovery of these woodlands.



### **Main Findings**

- Over a 12-year period, 13 of 20 sites improved in condition (all sites from fair to good). The remaining seven sites either fluctuated (two sites) in condition or remained stable (five sites).
- Limited evidence of herbivore browsing impacts on tree recruits.
- Tree recruitment (Belah and Sugarwood) occurred in 60% to 70% of sites but numbers are low and insufficient to maintain population viability in the long-term. All recruitment was natural.
- Tree life stage distribution (demographic condition) is improving slowly with young trees present and limited decline in healthy trees.
- **Understorey conditon is improving** with large shrub and native species richness increasing and weed cover declining over the 12-year period.

Condition attribute	M1 (2012)			M2 (2018)			M3 (2024)		
(# sites)	Poor	Fair	Good	Poor	Fair	Good	Poor	Fair	Good
SAW condition state	3	16	1	4	16	0	3	3	14
Tree life stage distribution	3	10	7	3	13	4	3	4	13
Large shrub richness	14		6	15		5	7		13
Native plant richness	9		11	19		1	1		19
Weed cover 😽	0	0	20	1	1	18	0	1	19



Belah woodland site at eastern Murray-Sunset showing improvement from fair condition (2012, 2018; left and middle) to good condition (2024; right).

#### **Management Implications**

**Ongoing browsing herbivore control** to improve woodland condition. A rapid response to bushfires, when they occur, to limit negative impacts to Semi-arid Woodlands is required as this plant community is fire sensitive. Revegetation works could be undertaken at key sites targeting those in fair condition, including interplanting of medium to large shrubs, small trees and canopy trees.

## **Management implications**

Today these woodlands are very slowly showing signs of recovery with monitoring detecting improvements in condition between 2012 and 2024, particularly in eastern Murray-Sunset. However, improvements are taking too long for many of these woodlands to remain viable (successfully recruit and maintain all age classes) and resilient to a changing climate. Findings indicate that woodland structure is becoming simplified over time through the loss of large shrubs and multiple tree life stages. This highlights the need for ongoing restoration actions such as revegetation, browser control and fire prevention to improve the condition of these slow growing woodlands.

#### Where to next?

Overall, some of the Total Grazing Management Plan outcomes have been met. Positive changes include an increase in juvenile trees and limited evidence of herbivore browsing. Program recommendations include:

- Ongoing implementation of the Semi-arid Woodland Monitoring Program to inform recovery.
- Continued browser control to reduce negative impacts on regenerating woody plants.
- Rapid response to bushfires, when they occur, to limit negative impacts to Semi-arid Woodlands. Many semiarid woodland species are sensitive to fire and may be lost from the ecosystem following fire.
- Determine priority Semi-arid Woodlands for enhanced management to ensure that good-quality examples of these communities remain in the landscape.
- Prioritise revegetation works at woodland sites where the best return on investment can be confidently
  expected to improve (or maintain) woodland condition. For example, sites where interplanting of tube stock
  will result in increased large shrub species richness in the short-medium term (3-5 years) and increased
  healthy mature trees in the long-term (>10 years). Where possible, undertake this in good rainfall years, to
  sustain viable tree populations and increase the diversity of large shrubs and small trees.
  - Hattah-Kulkyne Buloke and Slender Cypress Pine woodlands interplanting of canopy trees, small trees and medium to large shrubs.
  - Eastern Murray-Sunset Belah woodlands interplanting of medium to large shrubs, small trees and to a lesser extent canopy trees.
- Determine revegetation success including the success of existing revegetation and the characteristics which made it successful. This will help inform future revegetation works.

### **Further Reading**

Parks Victoria (2017) The total grazing management plan for the restoration of semi-arid woodland and floodplain vegetation communities in the north-western (Mallee) parks 2016-2020. Internal Parks Victoria report, Mildura, Victoria.

Parks Victoria (2025) The total grazing management plan for the restoration of semi-arid woodland and floodplain vegetation communities in the north-western (Mallee) parks. Internal Parks Victoria report, Mildura, Victoria.

Moxham C., Kenny, S. and Moloney, P. (2023). Semi-arid Woodland Condition Monitoring Program five-year evaluation: progress towards the Total Grazing Management Plans' key evaluation questions. Unpublished Report for Parks Victoria. Arthur Rylah Institute for Environmental Research, Department of Energy, Environment and Climate Action, Heidelberg, Victoria.

Kenny S. and Moxham C. (2025) Victorian Semi-arid Woodlands: Vegetation Condition Monitoring Program Annual Report 2024-2025: Hattah-Kulkyne and eastern Murray-Sunset National Parks. Unpublished Report for Parks Victoria, Arthur Rylah Institute for Environmental Science, Department of Energy, Environment and Climate Action, Heidelberg, Victoria.

For further information contact: Claire Moxham (<u>claire.moxham@deeca.vic.gov.au</u>) or Sally Kenny (<u>sally.kenny@deeca.vic.gov.au</u>)

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



© The State of Victoria Department of Energy, Environment and Climate Action May 2025.



This work is licensed under a Creative Commons Attribution 4.0 International licence. To view a copy of this licence, visit creative commons.org/licenses/by/4.0/

#### Accessibility

If you would like to receive this publication in an alternative format, please telephone the DEECA Customer Service Centre on 136186, email <u>customer.service@deeca.vic.gov.au</u>, or via the National Relay Service on 133 677