Science for Saving Species

Research findings factsheet

Project 1.3.5



National Environmental Science Programme

Managing fire to protect the Endangered monsoon vine thickets of the Dampier Peninsula

In brief

The Endangered monsoon vine thickets of the Dampier Peninsula in Western Australia are a highly biodiverse ecological community. These thickets are very sensitive to the impacts of fire and are threatened by recurrent high-severity fires in the mid to late dry season.

The vine thickets are important to the Traditional Owners of the Dampier Peninsula, who have been working to protect the plant communities from severe wildfires and other threats.

We used high-resolution remote sensing imagery to compare changes in vegetation cover and condition in the monsoon vine thicket patches over a 36-year timeline. We also measured the frequency of fires in the woodland buffer zone around each monsoon vine thicket patch. We found that between 1986 and 2020, monsoon vine thicket vegetation condition and cover increased significantly, particularly since the implementation of fire management actions such as coordinated prescribed burning.

Our study provides evidence about the benefits of coordinated fire management and has also developed a method than can be used to monitor the effects of management actions into the future. In addition, Indigenous rangers can use the approach that we devised for prioritising ongoing management and monitoring of monsoon vine thicket patches in the region, and elsewhere.



Background

The monsoon vine thickets on the coastal sand dunes of the Dampier Peninsula, north of Broome in Western Australia, are a nationally Endangered ecological community, listed under the *Environment Protection and Biodiversity Conservation Act 1999.*

The thickets are highly biodiverse. Even though vine thickets occupy less than 0.01% of the land area of the Dampier Peninsula, they contain a quarter of all the plant species occurring on the Dampier Peninsula.

The vine thickets are fire-sensitive, and threatened by recurrent, highseverity fires that take place in the mid to late dry season. These wildfires 'eat away' at the edges of the vine thickets and cause the canopy to become more open. This change allows other major threats like weeds to move into the thickets, which can provide fuel to make future fires even more damaging.

Vine thickets are culturally and ecologically important to the Traditional Owners of the Dampier Peninsula. TOs and ranger groups in the region are responsible for protecting the cultural and ecological values of the vine thicket patches within their Indigenous Protected Area and Native Title areas. The Bardi Jawi Rangers, Nyul Nyul Rangers and Yawuru Country Managers have been working with











partment of Biodiversity, nservation and Attractions











Background (continued)

government and non-government agencies to protect the vine thickets from severe wildfires and other threats, on the lands they work on. This collaboration is organised through two working groups. The Dampier Peninsula Fire Working Group brings together rangers, other land managers and stakeholders to cooperate over fire management across the whole peninsula. The Monsoon Vine Thicket Working Group carries out more focused restoration and management work in the vine thickets.

Management effort to protect the monsoon vine thickets has increased over the past decade, but especially since 2016, when the collaborative Dampier Fire Management project began.

Research aims

We aimed to test whether the increased management efforts on the Dampier Peninsula were making a difference to monsoon vine thickets. We also aimed to identify which monsoon vine thicket patches are doing well, and which could benefit from more management attention.





Bardi Jawi Ranger Phillip McCarthy ignites an early season buffer burn to protect the monsoon vine thicket. Image: Louise Beames

What we did

This project was designed with the ranger groups and the two working groups through a series of meetings in 2019. It was a desk-based study. The project focused on all mapped patches of monsoon vine thickets around the coast of the Dampier Peninsula.

We used imagery from Landsat satellites to look at the changes to canopy condition, using the Enhanced Vegetation Index

LEFT: Healthy monsoon vine thicket canopy. Image: Louise Beames measure of greenness as an indicator of vegetation health. We sampled the Enhanced Vegetation Index at 30 metre intervals. We assessed changes in canopy condition over a 36-year timeline, from 1985–2020. We also used Landsat imagery mapped mild and severe fires that occurred within a 300-metre buffer of woodland surrounding each monsoon vine thicket patch over a 20-year period, from 2000–19.

Key findings

We found that the canopy condition of vine thickets steadily increased between 1986 and 2020. All individual patches showed increases in canopy condition, with varying rates of increase.

The fire history analysis from 2000–19 showed subtle changes in the fire regime coinciding with when fire management efforts were increased across the peninsula, from 2011. The frequency of severe fires (i.e., years with extensive mid to late dry season fires) was reduced, and the proportion of areas burnt each year became more consistent during this period. Since 2016, when fire management efforts increased substantially, the severity of fires has reduced significantly, and the timing of fires has shifted, with fires now happening earlier in the dry season.

Frequent, severe fires are limiting the extent to which canopy condition is increasing in the vine thickets. Even though canopy condition is increasing across the monsoon vine thicket patches, the relative amount of increase is lower for patches that have experienced high fire frequency.

We found that the coordinated prescribed burning being carried out by ranger groups, pastoralists and other land managers is reducing the incidence of severe fires in the mid to late dry season. This, in turn, is leading to improvements in canopy condition in the monsoon vine thicket patches.



Figure: Time series of mean canopy cover of the Dampier Peninsula monsoon vine thickets estimated using Landsat satellite imagery. The dotted line indicated the trend of increase over time.

Unfortunately, not all of the monsoon vine thicket patches on the peninsula are improving in condition to the same extent. Some patches still require more intensive management attention, to reduce the risk of fire and other threats, such as unmanaged visitor access, weeds and sand dune movement.

The general trend of increasing canopy condition in the Dampier Peninsula monsoon vine thickets is similar to reports of woody thickening (increasing tree density) in rainforests and tropical savannas across northern Australia and globally. This general trend may be due to increasing levels of carbon dioxide in the atmosphere, a trend of increasing rainfall, or both.

RIGHT: Fire has burnt into edge of this monsoon vine thicket, damaging much of the vegetation including this old cocky apple (Planchonia careya) tree. Image: Louise Beames



BELOW: Bardi Jawi Ranger Chris Sampi removes vine weeds from the edge of a thicket. Weeds can provide fuel for more damaging fires. Image: Louise Beames

Implications

Our study provides evidence about the benefits of coordinated fire management for fire-sensitive vegetation that sits within a more flammable woodland matrix. The study also provides direct evidence of management outcomes for the Dampier Peninsula Fire Working Group and the Monsoon Vine Thicket Working Group. The study has also developed a method than can be used to monitor the status of monsoon vine thickets, and the effects of management actions into the future.

The imagery interpretation and analysis methods that we used were transferred to the members of the monsoon vine thicket working group during an end-ofproject workshop. The Bardi Jawi Rangers, Nyul Nyul Rangers and Yawuru Country Managers will use these findings to report against targets in their Healthy Country and Indigenous Protected Area management plans. In addition, the rangers can use the approach, combined with on-ground survey results, to find patches whose



condition is not improving so they can be prioritised for management and ongoing monitoring.

Further work that the rangers are now planning includes measuring changes to vine thicket area over several decades using historical aerial photography and using the greenness index to detect other vine thicket patches that are currently unmapped. Future work also includes ground truthing results from the remote sensing project to identify whether other disturbances are contributing to increases or decreases in canopy condition of monsoon vine thicket patches.

Cited material

Lemon, A. 2020. Managing fire to recover monsoon vine thickets on the Dampier Peninsula. Honours thesis, Charles Darwin University.

Further Information

Anna Lemon - weeping.ficus@gmail.com | Brett Murphy - Brett.Murphy@cdu.edu.au Sarah Legge - sarahmarialegge@gmail.com | Malcolm Lindsay - malcolm@environskimberley.org.au Louise Beames - louise@environskimberley.org.au



Cite this publication as NESP Threatened Species Recovery Hub. 2021. Managing fire to protect the Endangered monsoon vine thickets of the Dampier Peninsula, Project 1.3.5 Research findings factsheet.