Parks Victoria Research Partners Panel
Project Summary Report

Recovery of ecosystems after removal of *Pittosporum undulatum* (Sweet Pittosporum)

Parks Victoria and Monash University

Background

Range expansion by Sweet Pittosporum has resulted in large reductions to biodiversity and suppression of important over story species. Significant funding has been allocated directly to the removal of Sweet Pittosporum in Victoria, but the capacity for communities to recover along with the timescale of recovery is yet to receive systematic study. This project will compare the composition and diversity of plant communities 1-20 years after Pittosporum has been removed with equivalent undisturbed, reference sites.

Outcomes from this project will assist Parks Victoria by emphasising best practise management techniques for restoring ecosystems, providing a timeline for effective management of invasive species.

Sweet Pittosporum is a tree species native to coastal South Eastern Australia. European arrival and the subsequent changes to fire regimes, increased disturbance and the introduction of pest species such as the European blackbird (*Turdus merula*) have seen the range of this species expand across much of Victoria. Sweet Pittosporum is considered a highly plastic species, allowing it to establish and thrive in most environments. Pittosporum is now common across this expanded range, particularly in peri-urban environments found in the Dandenong Ranges, Mornington Peninsula and the Otway Ranges. As a shade tolerant species it produces a dense canopy, reducing light resources to the understory and drastically reducing biodiversity. Warnings of the effects of Sweet Pittosporum were first aired in the early 80s. Since that time its range has expanded further, placing further pressure on endemic species and communities already stressed by urban expansion, invasive species and climate change.

Relevant parks and ecosystems

Dandenong Ranges National Park, Panton Hill G144 Bushland Reserve. Devils Bend Natural Features Reserve, Red Hill South Bushland Reserve

More information

Contact Parks Victoria on 13 1963

Publications and presentations

O'Leary B (2017) Light at the end of the tunnel: The ecology and management of Pittosporum undulatum. Presentation to Southern Peninsula Indigenous Flora & Fauna Assoc.

O'Leary B, Burd M, Venn SE & Gleadow R (2018) Integrating the Passenger-Driver hypothesis and plant community functional traits to the restoration of lands degraded by invasive trees. *Forest Ecology and Management*. 408, pp 112-120

O'Leary BA (2019)The ecology, management and restoration of ecological communities affected by Pittosporum undulatum Vent. across Victoria, Australia. Ph D Thesis, Monash Univeristy

Sweet Pittosporum in Flower

Area dominated by invasive population of Sweet Pittosporum

Aims

The aim of this project is to assess the composition and diversity of plant communities across the Port Phillip region after Pittosporum undulatum has been removed at different intervals over the past decade. These results will be compared to equivalent undisturbed sites.

This project is designed to determine whether communities previously invaded by Sweet Pittosporum can recover without additional planting and restoration. The study also aims to track the rates of recovery so as to provide a timeline of what to expect for populations in the future. A final objective to studying the recovery of communities post Sweet Pittosporum removal is to establish the prominence of weeds and if their densities/diversity reduce over time.

Specific research questions will be used to structure the work

- Are previously invaded communities capable of re-establishing after the removal of weedy Sweet Pittosporum?
- How long does a community take to recover?
- How susceptible to invasion are these sites and do weed densities change over time?

Results

There are four main findings: 1) Low levels of native and non-native species richness and canopy cover recorded at communities impacted by dense *P. undulatum* populations; 2) very low densities of *P. undulatum* at all cleared areas after removal; 3) removing *P. undulatum* caused an increase in species richness, particularly for native species; and 4) over time, management intervention lead to increasing similarity in community composition and function between cleared areas and remnant controls.

Implications

Our case study demonstrates how community assembly theory and the Passenger-Driver hypothesis can be used effectively to understand the mechanisms at play between native and exotic drivers of community composition and function. Results are discussed in relation to how ecological theory can be applied to inform and improve invasive species management and restorative actions.