

## **Progress Report SP 2018-077**

# **Restoration science**

**BCS Kings Park Science**

### **Project Core Team**

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X X  
**Project Team** granted  
**Program Leader** required  
**Directorate** required



# Restoration science

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## Context

Restoration science is a multidisciplinary approach to provide a comprehensive scientific basis for restoration actions across the State. Overall, the research includes seed science, provenance, ecohydrology, ecophysiology, soil science, community ecology and plant-enabling technologies. Restoration science works across diverse systems including Pilbara grassland and savanna, mid-west shrublands, Swan Coastal Plain banksia woodlands and shrublands, jarrah forest, marine seagrass meadows, and arid coastal communities, through collaboration with a variety of stakeholders. Restoration science is well placed to provide the applied scientific solutions required for all plant community restoration activities.

## Aims

- Establish targets and criteria for restoration success.
- Determine appropriate sourcing of biological materials for restoration.
- Optimise establishment of plants in restoration.
- Determine factors influencing growth and survival of plants in restoration.
- Determine factors influencing resilience, sustainability and landscape integration.

## Progress

- Continued to use ecophysiological and remote sensing tools to monitor chlorotic decline syndrome within the jarrah and marri trees of Kings Park. This data is supporting baseline observations before mitigation actions (acidifying of the bore water) are undertaken in Kings Park in late 2023.
- Extended the collaborative program with DPIRD to understand biodiversity values of Kimberley grassland grazing systems. Small scale plots were established in Perth to determine seedfarming constraints for priority grasses. Exclosure plots that were previously established in the Kimberley have been assessed to understand constraints to native grass seedling establishment.
- Continued to optimise habitat modelling approaches for the narrow range endemic *Aluta quadrata* from the Pilbara and have undertaken ecophysiological surveying, isotopic and mineral nutrition studies to understand plant niche requirements in collaboration with Rio Tinto.
- Commenced a project to study the pollination and reproduction of the endangered *Aluta quadrata* in the Pilbara, with funding from Rio Tinto
- Commenced initial species distribution modelling for the rare ironstone endemic *Tetratheca butcheriana* from the Pilbara to inform niche suitability and site selection for ecophysiological monitoring of the rock endemic, with funding from Rio Tinto.
- Several projects continued through CRC TiME (Transformations in Mining Economies) including: Evidence for effectiveness of climate-adapted seed sourcing strategies for revegetation success and transition to mine closure in a changing climate, The Australian Seed Scaling Initiative, and Returning Ecosystem Resilience.
- Continued field and controlled environmental studies for *Stylidium* species to determine climate and edaphic interactions on seed biology and plant ecophysiology in the jarrah forest along the Darling Scarp.

## Management implications

- Providing baseline physiological and tree canopy information of jarrah and marri trees currently impacted by chlorotic decline will enable quantifiable impacts of changing irrigation infrastructure and regimes on tree health.
- Providing findings from rare species distribution models, plant function and interactions with pollinators informs decision making around rare species conservation and management within the mining sector.
- Informing seed sourcing and seed usage to deliver greater biodiversity in a more cost-effective manner to support minesite rehabilitation programs.

## Future directions

- Continue to develop an understanding of drivers of rare species functioning and distributions to inform conservation and restoration strategies.
- Continue to determine seed biology, ecology, pasture values and seed production capability of northern native grass species to inform potential management of the Kimberley rangeland systems.
- Continue to revolutionise the way seeds of native species are collected and used in rehabilitation to ensure resilience and biodiverse outcomes for a range of stakeholders.