



THE UNIVERSITY OF  
**WESTERN  
AUSTRALIA**

Institute of  
Agriculture

UWA FARM RIDGEFIELD

# Multiple Ecosystems Services Experiment

UWA Farm Ridgefield is a 1600-hectare mixed-enterprise farm near Pingelly in Western Australia. The farm facilitates multidisciplinary research as part of the Best Practice Farming Systems Project, which is focused on five key priorities:

1. Mitigation of on-farm greenhouse gas emissions
2. Adaptations for the changing climate
3. Profitable, ethical production systems
4. **Restoration of ecosystems and biodiversity**
5. Education, community engagement and capacity building

When the farm was purchased by The University of Western Australia (UWA), approximately 30 per cent of the land area was prioritised for **Restoration of ecosystems and biodiversity**. As part of this enterprise, UWA Farm Ridgefield became home to the Ridgefield Multiple Ecosystem Services Experiment.

Large-scale ecological restoration is a vital component of our response to ongoing environmental change and land degradation. The Multiple Ecosystem Services Experiment at Ridgefield offers a unique site to demonstrate how we can provide multiple ecosystem outcomes for both farmers and the broader public, through restoration of agricultural land.



Ecosystem services include properties and processes such as carbon sequestration to mitigate climate change, prevention of soil erosion, provision of clean water, biotic resistance to invasion, nutrient cycling and provision of habitat for native flora and fauna.

In 2010, under the leadership of Emeritus Professor Richard Hobbs and his team, 20 ha of 128 ecosystem plots were planted at Ridgefield, comprising 14,000 trees and shrubs on land previously used for cropping and grazing. The guide for the restoration plots was to return vegetation that had existed before the land had been cleared – York gum woodland species (eucalypts, wattles and banksias).

The initial multiple ecosystem services experiment looked at how different species assemblages and their micro-communities interact and affect carbon storage, the physical, chemical and biological properties of the soil, including the work of soil microbes and macrofauna (for example, termites), as well as pollination, recolonisation by native plants and animals, and the invasion of weeds.

The experiment found that historical land-use at the site has the potential to affect service delivery via different soil characteristics and survival of planted species. Subsequent experiments at the site found that non-native plants and nitrogen addition have little effect on pollination and seed set in three-year-old restored woodland. Several significant publications have resulted from these experiments (Fiedler et al. 2021; Johnson et al. 2020; Perring et al. 2012; Yeeles et al. 2016) and the site is part of the TreeDivNet platform.

References

- Fiedler S, Monteiro JAF, Hulvey KB, Standish RJ, Perring MP and Tietjen B (2021). Global change shifts trade-offs among ecosystem functions in woodlands restored for multifunctionality. *Journal of Applied Ecology* doi: 10.1111/1365-2664.13900
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- Perring MP, Standish RJ, Hulvey KB, Lach L, Morald TK, Parsons R, Didham RK and Hobbs RJ (2012). The Ridgefield Multiple Ecosystem Services Experiment: Can restoration of former agricultural land achieve multiple outcomes? *Agriculture, Ecosystems and Environment* 163 14-27
- TreeDivNet. A unique platform for ecosystem research in tree diversity experiments worldwide Ridgefield (Australia). Accessed 24 November 2021 <https://treedivnet.ugent.be/ExpRidgefield.html>
- Yeeles P, Lach L, Hobbs RJ, van Wees M, Didham RK (2016). Woody plant richness does not influence invertebrate community reassembly trajectories in a tree diversity experiment. *Ecology* 98 500-511



The plan is to continue to undertake experiments and observations to understand restoration of agricultural land to provide multiple ecosystem services on a long-term basis. The site is now over 10 years old and represents an extraordinary area to undertake research, with a full history on the historical management of the site.

**We are currently looking for partners to continue to expand this work and add to the understanding of multiple ecosystem services on restored agricultural land at Ridgefield and elsewhere. This understanding has direct implications for the emerging markets for carbon, biodiversity co-benefits, and ecosystem services such as pollination.**