

# Great Western Woodland Supersite

## Affiliated projects summary

<b>Date: 09/08/2013</b>
<b>Project title:</b> Climate-resilient revegetation of multi-use landscapes: exploiting genetic variability in widespread species.
<b>Abstract:</b> Multi-million dollar investments in maintenance of ecosystem function through restoration of Australia's degraded and fragmented multi-use landscapes currently take little account of climate change. Until recently there has been a strong focus on maintaining local genetic patterns for optimal restoration. In a changing climate this paradigm may no longer be relevant. The optimal seed-sourcing strategy for restoration will depend on a species existing patterns of climate adaptation. Species with strong local adaptations to climate may benefit from some form of translocation to assist the movement of adaptive genes within the landscape. On the other hand, translocation may not be warranted for highly plastic species with the ability to adjust to climatic changes <i>in-situ</i> .  We are examining patterns of climate adaptation in widespread <i>Eucalyptus</i> species relevant to re-vegetation of multi-use landscapes, including populations of <i>E. salubris</i> from throughout the WA wheatbelt and Great Western Woodlands. The study populations were distributed across a climate gradient, from 200 mm mean annual precipitation (MAP) and 26°C mean annual temperature (MAT) at the most arid site, to 400 mm MAP and 21°C MAT at the least arid site. We are conducting genomic analysis (via DArT markers) and ecophysiological measurements (including leaf morphology, and carbon isotope ratios as an indicator of water use efficiency). These data will be used to look for evidence of local adaptation to climate, and plastic responses to climate, which could be used to inform re-vegetation strategies.  Expected project timeframe: January 2012 – January 2014
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<p><b>Funding sources:</b> National Climate Change Adaptation Research Facility and Great Western Woodlands Supersite (Terrestrial Ecosystems Research Network).</p>
<p><b>Datasets being used or collected:</b>  Data from nine <i>Eucalyptus salubris</i> populations, in the wheatbelt and Great Western Woodlands, including a population at Credo.  Data collected: genomic data (DArT markers), leaf size, leaf thickness, leaf density, specific leaf area, leaf carbon isotope ratios, leaf nitrogen content, trunk branching, trunk cross-sectional area, surface soil properties.  Other data used: climate data from BOM and SILO.</p>
<p><b>Geographic coverage of study:</b>  Populations at Queen Victoria Springs Reserve, Credo Station, Bullock Holes Reserve, Coolgardie, Lake Johnson, Newdegate, Dunn Rock Reserve, Bruce Rock and Ravensthorpe.</p>
<p><b>Publications:</b>  Byrne, M, Prober, SM, McLean, EH, Steane, DA, Stock, WD, Potts, BM &amp; Vaillancourt, RE  2013, <i>Adaptation to climate in widespread eucalypt species</i>, National Climate Change Adaptation Research Facility, Gold Coast, 86 pp. ISBN: 978-921609-98-5  <a href="http://www.nccarf.edu.au/publications/adaptation-climate-eucalypt-species">http://www.nccarf.edu.au/publications/adaptation-climate-eucalypt-species</a></p>