Progress Report SP 2006-008

Identification of seed collection zones for rehabilitation

Ecosystem Science

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Project status as of July 10, 2020, 11:40 a.m.

Update requested

Document endorsements and approvals as of July 10, 2020, 11:40 a.m.

Project Team	required
Program Leader	required
Directorate	required

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Context

The Conservation and Ecosystem Management Division of the department provides guidelines to the Forest Products Commission on seed collection zones for forest rehabilitation. Rehabilitation of sites through revegetation requires knowledge of the genetic adaptation of species to sites in order to manage in an ecologically sustainable fashion. This requires an understanding of the genetic structure and local adaptation of species.

Aims

- Identify appropriate seed collection zones (provenances) for species being used for rehabilitation. Initial work is focused on species in the jarrah and karri forest where seed is used for rehabilitation after logging.

Progress

- Analysis of genetic relationships among *Corymbia calophylla*, *C. haematoxylon* and *C. ficifolia* shows distinct genetic separation in the nuclear genome and shared cpDNA haplotypes, consistent with shared evolutionary history. A paper is in preparation.
- Analysis of microsatellite variation and cpDNA variation in 28 populations of *Banksia sessilis* revealed two major genetic clades, one on the Darling Range and Plateau, and another on coastal limestone that exhibited both higher genetic diversity and greater structure. The patterns of genetic diversity and phylogeographic structure suggest the ancestor to these clades originated in the northern coastal environment and diversified through the Darling Plateau during the mid-Pleistocene. **This paper has been submitted for publication to the journal Ecology and Evolution.**

Management implications

- Knowledge of genetic structure and local adaptation will enable identification of appropriate seed collection zones for rehabilitation of forest areas, in order to maintain the genetic integrity of the forest on a sustainable basis. Data from previous research on *Kennedia coccinea, Bossiaea ornata* and *Allocasuarina humilis* indicate that seed collected from the same landscape management unit as the area to be rehabilitated would be an acceptable seed-sourcing strategy. Alternatively, where seed is not readily available from the relevant landscape management unit then use of seed from nearby areas in adjacent landscape management units would also suffice. This information has been used to update seed collection zones for forest rehabilitation in the *Forest Management Plan 2014-2023*.

Future directions

- Complete publication of genetic analysis of *Corymbia* species.