

# SOME LESSONS FOR NATIVE FOREST REHABILITATION FROM LONG TERM MONITORING AT THREE SURFACE MINES IN AUSTRALIA

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*Blakemere Consultants Ltd*



# Location of Example Sites

- Surface Coal Mine
- Mineral Sand Mine
- Bauxite Mine



Mineral Sand Mine, >>  
North Stradbroke Island,  
Queensland



Surface Coal Mine >>  
Yarraman,  
Queensland



**Bauxite Mine** >>  
**Banksiadale,**  
**Western Australia**



*Eucalyptus pilularis*  
open forest

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*Eucalyptus – Corymbia – Angophora*  
woodland

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*Eucalyptus marginata* – *Corymbia calophylla*  
tall open forest



# LESSON 1 – Vegetation Composition





Short-lived closed monoculture on >>>  
rehabilitated surface coal mine

# Trend in Vegetation Composition in Rehabilitated Forest

Main Tree and Shrub Species	Mineral Sand Mine	Surface Coal Mine	Bauxite Mine
Number Reference Stand Species	8	8	6
Number Reference Species in Rehabilitation	3	3	4
Number of Non-Reference species in Rehabilitation	3	5	7

# LESSON 2 – Vegetation Structure



# Comparative Structural Traits – Mineral Sand Rehabilitation

Target Community	Growth Form Class	Canopy Separation	Structural Formation Class
<i>Corymbia intermedia</i> open-forest	Trees 10–30m	Mid-dense	Open-forest
<i>Eucalyptus pilularis</i> woodland	Trees 10–30m	Sparse	Woodland
<i>Eucalyptus planchoniana</i> – <i>Banksia aemula</i> low open-forest	Trees <10m	Mid-dense	Low open-forest
Rehabilitation Age	Growth Form Class	Canopy Separation	Structural Formation Class
15 years	Shrubs 2–8m	Mid-dense to Dense	Open scrub / Closed scrub
20 Years	Shrubs 2–8m	Dense	Closed scrub

# Comparative Structural Traits – Surface Coal Mine Rehabilitation

Target Community	Growth Form Class	Canopy Separation	Structural Formation Class
<i>Eucalyptus creba</i> <i>Angophora</i> woodland	Trees 10–30m	Sparse	Woodland
<i>Eucalyptus creba</i> – <i>Corymbia spp</i> – <i>E.</i> <i>tereticornis</i> open forest	Trees 10–30m	Sparse to Mid–dense	Woodland–open forest
<i>Eucalyptus creba</i> – <i>E.</i> <i>moluccana</i> open forest	Trees 10–30m	Sparse to Mid–dense	Woodland–open forest
<i>Eucalyptus creba</i> woodland	Trees 10–30m	Sparse	Woodland
Rehabilitation Age	Growth Form Class	Canopy Separation	Structural Formation Class
16	Shrubs 2–8m	Mid–dense	Open scrub



Intervention by thinning on rehabilitated bauxite mine >>>



Less dense seeding promoting development of woodland/open forest on bauxite mine >>>



# Comparative Structural Traits – Bauxite Rehabilitation

Target Community	Growth Form Class	Canopy Separation	Structural Formation Class
<i>Eucalyptus marginata</i> – <i>Corymbia calophylla</i> forest	Trees >30m	Mid-dense to Dense	Tall open forest / Tall closed forest
Rehabilitation Age	Growth Form Class	Canopy Separation	Structural Formation Class
15 Years	Trees 10–30m	Sparse to Mid-dense	Woodland / Open forest

# LESSON 3 – Functioning Ecosystem





Even-aged maturing rehabilitated stand >>>  
on bauxite mine

# Conclusions

**Lesson 1** – Faithful initial vegetation composition is crucial unless subsequent planned intervention

**Lesson 2** – Structural composition is crucial in trajectory of developing and maturing forest and woodland requiring less dense establishing stands or planned intervention

**Lesson 3** – Sustainable re-establishment of ecosystem functioning requires multi-aged stands which is a matter of time and ongoing intervention

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*The opinions expressed are solely the author's*