

# VEGETATION SURVEY SURROUNDING SCHWENKE'S DAM

Compiled for the Blackwood Basin Group  
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## DISCLAIMER

This report has been prepared for the exclusive use of the Client (Blackwood Basin Group) to the best of the author's (Jodi Wildy) knowledge at the time. The report findings are based on data supplied by the Client, desktop analysis of publicly available data, field observations and field data.

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# 1. INTRODUCTION

## 1.1 Survey scope

The Blackwood Basin Group (BBG) is undertaking a four-year project to enhance an old deep-walled mining pit with little shore vegetation into a water body that could extend the habitat and forage resources for EPBC Act listed, priority and non-threatened water bird species in the Greenbushes area. For revegetation and replication of habitat, the existing vegetation types within and adjacent to this habitat need to be described. This vegetation survey will aim to describe and map the various types of existing vegetation within the prescribed survey area surrounding Schwenkes Dam.

## 1.2 The Survey Area

Schwenkes Dam is an historical steep-sided mining pit located along Spring Gully Rd, Greenbushes, Western Australia (Figure 1). All areas adjacent and near to the dam have been partially or fully cleared for mining operations. Mine spoils form small 'dunes' throughout the disturbed areas of the site.

At a regional level, the forested areas of the south-west have been mapped by Mattiske and Havel (1998). Taking into account climatic factors, topography and soil type, this survey has produced an extensive description of the general floristic composition and structure of the vegetation in the south-west as it would have been prior to European settlement. From the Mattiske survey, two broad vegetation complexes were defined around Schwenkes Dam:

**Bridgetown Complex in medium to high rainfall (BTf):** Mild slopes in the Blackwood Valley with yellow-brown sandy loams over laterite. Open forest of *Corymbia calophylla* with *Eucalyptus marginata* on upper slopes and *E. rudis* on lower slopes over a midstorey of *Hakea lasianthoides* and understorey of *Leucopogon capitellatus*, *L. propinquus*, *Hibbertia hypericoides*, *Phyllanthus calycinus*, *Hibbertia amplexicaulis*, *Banksia dallanneyi*, *Chorizema ilicifolium*, *Lepidosperma tenue*, *Pimelea argentea* and *Dodonaea viscosa*

**Dwellingup (D1) and Hester Complex (HR) in high rainfall and subhumid central:** Undulating uplands brown gravelly loams over gravel and deep gravels (with sand) over clay. Open forest of *Eucalyptus marginata* over *Corymbia calophylla* over a midstorey of *Banksia grandis*, *Allocasuarina fraseriana*, and *Persoonia longifolia* over an understorey of *Bossiaea linophylla*, *B. ornata*, *Hibbertia commutata*, *Hibbertia amplexicaulis*, *Leucopogon capitellatus*, *L. verticillatus*, *L. propinquus*, *Hakea lissocarpha*, *Hibbertia hemignosta*, *Platytheca galioides* and *Macrozamia riedlei*.





Figure 1. Map of 2014 outlining the area for the vegetation survey at Schwenkes Dam (Courtesy of the Blackwood Basin Group).

## 2. METHODOLOGY

### 2.1 Desktop Survey

Discrete changes in vegetation canopy cover were identified using aerial imagery, whilst taking into account topography and proximity to the Dam. Groups of vegetation similar in appearance on the aerial photo were verified and corrected during the on-ground survey.

### 2.2 Field survey

The on-ground vegetation survey was conducted on foot on the 12<sup>th</sup>, 18<sup>th</sup> and 20<sup>th</sup> June, 2014. The survey area was previously defined by the Blackwood Basin Group (Figure 1). Informal relevés (10 x 10 m) were conducted in each discrete group of vegetation to determine vegetation structure and composition.

The following details were recorded for each group of vegetation:

- Topography, slope and surface soil type
- Leaf litter cover, occurrence and type of exposed rock
- Average height of dominant taxa in each strata
- Canopy cover of dominant taxa with each strata
- Vegetation condition (Table 1) according to the Government of Western Australia Vegetation Condition Scale (2000).
- Presence of Threatened or Priority Flora or other significant flora
- List of all identifiable flora observed

Table 1. Bush forever condition scale (Government of Western Australia, 2000)

Classification	Description
1 <i>Pristine or nearly so</i>	No obvious signs of disturbance
2 <i>Excellent</i>	Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species
3 <i>Very Good</i>	Vegetation structure altered, obvious signs of disturbance
4 <i>Good</i>	Vegetation structure significantly altered by very obvious signs of multiple disturbance, retains basic vegetation structure or ability to regenerate it
5 <i>Degraded</i>	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6 <i>Completely degraded</i>	The structure of the vegetation is no longer intact and the area is completely or almost without native species

Vegetation descriptions were defined using the Broad Floristic Formations table in 'The Australian Soil and Land Survey Handbook' (National Committee on Soil and Terrain 2009).

### 2.3 Limitation

Some of the areas on the map may have changed due to recent earthworks on site that are not shown on the aerial imagery. Additionally, due to time constraints and the nature of the survey, some of the boundaries between vegetation groups have not been ground-truthed during this survey. Therefore the boundaries between groups should be considered as the area representative for a specific type of vegetation, not the precise location.

## 3.0 RESULTS

The vegetation adjacent and surrounding Schwenkes Dam reflect the disturbance history involved with previous mining operations and attempts at rehabilitation. To reduce complexity, this vegetation survey identified nine discrete types of vegetation based on the structure and density of dominant vegetation within a specific area that was defined either by soil type, disturbance and proximity to the water (Figure 2).

Attempts at rehabilitation have occurred on the upland slopes to the east of the dam, however the remainder of the vegetation immediately surrounding the dam to the south-east and east of the dam is primarily regrowth or passive revegetation since disturbance from mining operations ceased at the site. The dominant shrub species present in the dense and scattered regrowth are the profligate Myrtaceous seeders *Taxandria*, and *Astartea*, and *Hakea prostrata*. These species have been able to out-compete those less in number during the first stages of colonisation of the mining spoils.

The small area of intact *Eucalyptus marginata* trees over *Banksia grandis* trees bore some resemblance to the Mattiske Dwellingup-Hester Vegetation Complexes, however there was little else vegetation surrounding Schwenkes Dam that resembled the Bridgetown or Dwellingup-Hester Vegetation Complexes.

Characteristics of each vegetation type are tabulated in Table 2.



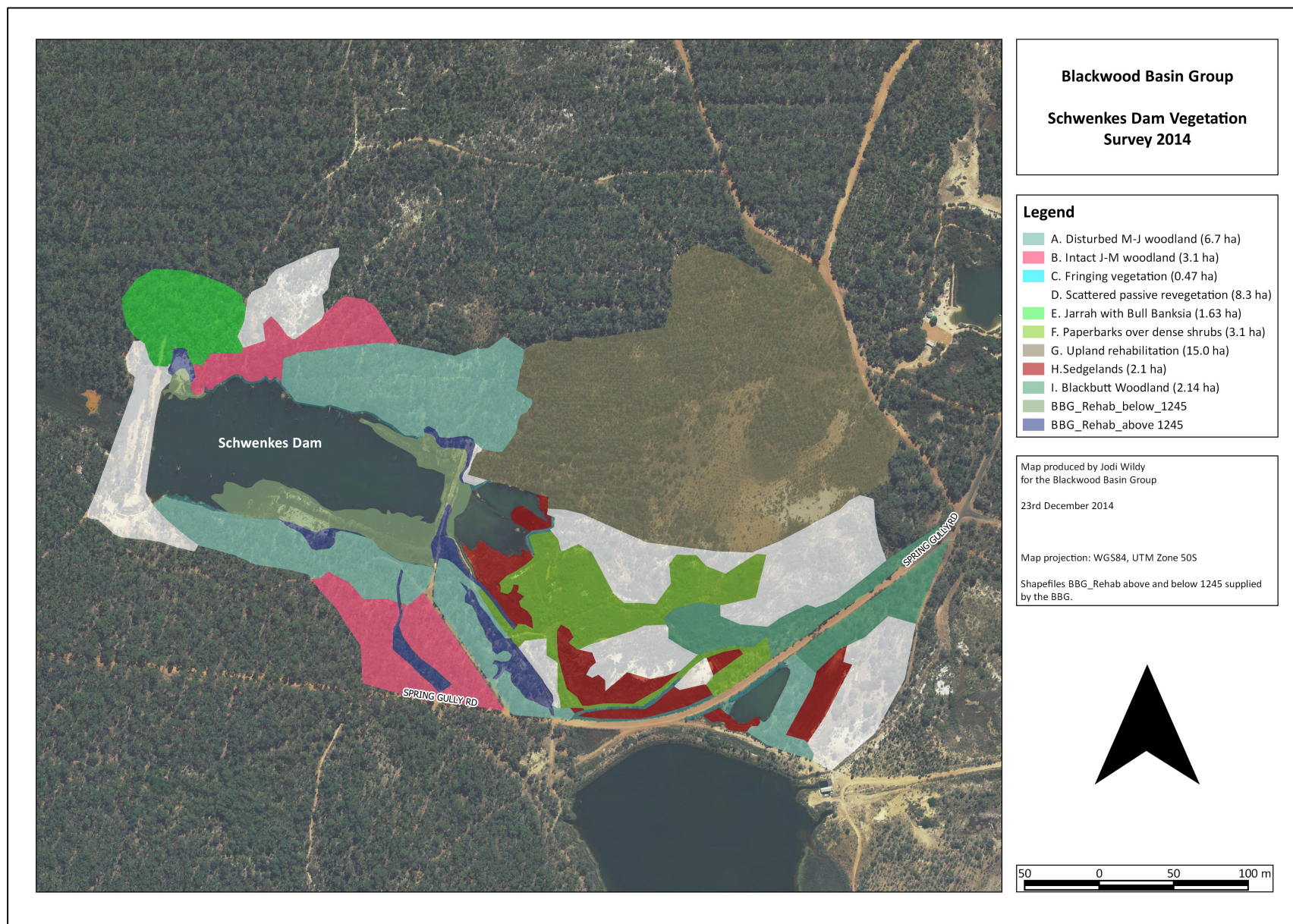


Figure 2. Mapped vegetation types in disturbed and undisturbed areas at Schwenkes Dam, Greenbushes Western Australia.

Table 2. Characteristics of the vegetation types defined at Schwenkes Dam, Greenbushes.

Type of Vegetation	Typical location at Schwenkes Dam site	Area (ha)	Soil type	Dominant vegetation	Associated species (Not exhaustive)	Condition (Government of Western Australia, 2000)
<b>A. Disturbed Marri-Jarrah Woodland</b> Sparse and low <i>Corymbia calophylla</i> trees over mid-dense <i>C. calophylla</i> regrowth and sparse shrubs	Lower slopes and surrounding dam.	6.7	Gravelly sands	<i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , * <i>Acacia pycnantha</i> , <i>Hakea prostrata</i>	<i>Acacia extensa</i> , <i>Acacia myrtifolia</i> , <i>Billardiera heterophylla</i> , <i>B. fusiformis</i> <i>Bossiaea ornata</i> , * <i>Conyza canadensis</i> , <i>Eucalyptus rudis</i> , <i>Hibbertia hypericoides</i> , <i>Hypocalymma angustifolium</i> , <i>Leucopogon capitellatus</i> , <i>L. propinquus</i> , <i>L. verticillatus</i> , <i>Patersonia occidentalis</i> , * <i>Watsonia</i> S.,	<b>Very Good</b> Regrowth vegetation with disturbed understorey allowing for colonisation by weeds. Structure and composition remain intact.
<b>B. Intact Jarrah-Marri Woodland</b> Sparse and tall <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> trees over very sparse tall shrubs over very sparse shrubs	Mid slope on northern and southern flanks of the dam	3.13	Sandy loam with gravel and occasional outcrop of conglomerated laterite	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> , <i>Persoonia longifolia</i> , <i>Hakea prostrata</i> , <i>Acacia myrtifolia</i> , <i>Xanthorrhoea preissii</i> , <i>Leucopogon capitellatus</i> , <i>Bossiaea ornata</i>	<i>Acacia extensa</i> , <i>Acacia pulchella</i> , <i>Astroloma pallidum</i> , <i>Banksia dallanneyi</i> , <i>Gastrolobium bilobum</i> , <i>Hakea amplexicaulis</i> , <i>Hibbertia commutata</i> , <i>H. hypericoides</i> , <i>Hovea chorizemifolia</i> , <i>Hypocalymma angustifolium</i> , <i>Lagenophora huegelii</i> , <i>Leucopogon propinquus</i> , <i>L. Verticillatus</i> , <i>Macrozamia riedlei</i> , <i>Phyllanthus calycinus</i> , <i>Pteridium esculentum</i> , <i>Tetraria capillaris</i> , <i>Xanthorrhoea gracilis</i>	<b>Excellent</b> Colonisation of some non-aggressive weed species
<b>C. Fringing vegetation</b> Mid-dense to dense tall shrubs over mid-dense to dense sedges	Emergent-damp zone around the large dam periphery	0.47	Gravelly clay	<i>Taxandria linearifolia</i> , <i>Astartea fascicularis</i> , +/- ? <i>Meeboldina roycei</i> ,	No other species present during time of survey.	<b>Excellent</b> Discontinuous but when present, in excellent condition



Type of Vegetation	Typical location at Schwenkes Dam site		Soil type	Dominant vegetation	Associated species (Not exhaustive)	Condition (Government of Western Australia, 2000)
<b>D. Scattered Passive revegetation</b> Very sparse stunted <i>Eucalyptus</i> trees over mixed shrubs	Lower northern slope and flat to mildly sloping areas upstream of Schwenkes Dam	8.3	Gravelly, sandy clays, white sands	<i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , <i>Hakea prostrata</i> , <i>Taxandria linearifolia</i>	<i>Acacia myrtifolia</i> , <i>Acacia pulchella</i> , <i>Anigozanthos</i> spp., <i>Billardiera heterophylla</i> , <i>Bossiaea ornata</i> , <i>Bossiaea aquifolium</i> , <i>Conostylis aculeata</i> , <i>Hypocalymma angustifolium</i> , <i>Patersonia occidentalis</i> , <i>Persoonia longifolia</i> , <i>Pinus</i> sp., <i>Trymalium odoratissimum</i>	<b>Good</b> Active attempts at rehabilitation do not look obvious. Post-disturbance vegetation colonised on bare soil and mining spoils. Few weeds but also little species diversity, ground cover and vegetation stunted.
<b>E. Jarrah with Bull Banksia</b> Tall sparse <i>Eucalyptus marginata</i> with <i>Corymbia calophylla</i> over tall sparse <i>Banksia grandis</i> trees and mixed shrubs	Mid-slope, north-eastern end of Schwenkes Dam	1.63	Gravel with sand	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> , <i>Banksia grandis</i> , <i>Bossiaea ornata</i> .	* <i>Acacia pycnantha</i> , ? <i>Grevillea</i> sp., <i>Hibbertia commutata</i> , <i>Leucopogon capitellatus</i> , <i>L. verticillatus</i> , ? <i>Loxocarya cinerea</i> , <i>Macrozamia riedlei</i> , ? <i>Opercularia</i> sp., <i>Persoonia longifolia</i> , <i>Podocarpus drouynianus</i> , <i>Pteridium esculentum</i> , <i>Tetraria capillaris</i> , <i>Tetratheca</i> ? <i>hirsuta</i>	<b>Excellent</b> Vegetation structure intact with little signs of obvious disturbance
<b>F. Paperbarks over Dense Shrubs</b> Very Sparse <i>Melaleuca preissiana</i> trees over dense to very dense tall shrubs	Seasonal flats and alluvial dumps on SE end of dam	3.1	Gravelly, clayey sands	<i>Melaleuca preissiana</i> , <i>Acacia myrtifolia</i> , <i>Taxandria linearifolia</i> , <i>Astartea fascicularis</i> , <i>Hakea prostrata</i> , +/- <i>Banksia attenuata</i>	* <i>Acacia decurrens</i> , <i>A. pulchella</i> , * <i>A. pycnantha</i> , <i>A. urophylla</i> , <i>Anigozanthos</i> sp., <i>Billardiera fusiformis</i> , <i>Bossiaea aquifolium</i> , <i>B. linophylla</i> , <i>Callistachys lanceolata</i> , <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , <i>Hakea lissocarpha</i> , <i>Jacksonia furcellata</i> , <i>Patersonia occidentalis</i> , <i>Phyllanthus calycinus</i> , <i>Taxandria parviceps</i>	<b>Excellent</b> Previously disturbed, regrowth thick but in good condition. Some paperbarks showed signs of canopy decline.

Type of Vegetation	Typical location at Schwenkes Dam site		Soil type	Dominant vegetation	Associated species (Not exhaustive)	Condition (Government of Western Australia, 2000)
<b>G. Upland Rehabilitation</b> Very sparse stunted <i>Eucalyptus</i> trees over mixed shrubs	Mid to upper slope on eastern side of dam catchment	15.0	Gravel	<i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , <i>Hakea prostrata</i> , <i>Taxandria linearifolia</i>	<i>Acacia pulchella</i> , <i>A. myrtifolia</i> , <i>Anigozanthos</i> spp., <i>Billardiera heterophylla</i> , <i>Conostylis aculeata</i> , <i>Hypocalymma angustifolium</i> , <i>Patersonia occidentalis</i> , <i>Persoonia longifolia</i> , <i>Pinus</i> sp.	<b>Good</b> Areas where active attempts at rehabilitation look obvious. Few weeds but also little species diversity, ground cover and vegetation stunted.
<b>H. Sedgelands</b> Mid-dense to dense <i>Baumea</i> sedges	Flats subject to seasonal inundation in low lying areas near and adjacent to Schwenkes Dam and Spring Gully Rd	2.1	Clay	<i>Baumea rubiginosa</i>	? <i>Meeboldina roycei</i>	<b>Excellent</b> Dense coverage with few weeds present. Inundated in some areas. Little species diversity during winter. May increase in Spring when water levels recede.
<b>I. Blackbutt Woodland</b> Sparse <i>Eucalyptus patens</i> with <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> over sparse shrubs	Lower slopes along Pretty Gully Rd	2.14	Loamy gravelly sands	<i>Eucalyptus patens</i> , <i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> , <i>Banksia attenuata</i> , * <i>Acacia pycnantha</i> , * <i>Rubus</i> spp.	<i>Acacia extensa</i> , <i>Acacia pulchella</i> , <i>Bossiaea aquifolium</i> , <i>Hypocalymma angustifolium</i> , <i>Leucopogon verticillatus</i> , <i>Tetraria capillaris</i>	<b>Good</b> A small area on the lower slopes that has obvious disturbance to mid- and understorey in patches throughout. Most of the structure of this vegetation type remains intact.



Figure 3a. Example of Disturbed M-J Woodland (A) with Watsonia infestation.



Figure 3b. Schwenkes Dam with Sedgeland (H) in mid photo and disturbed M-J Woodland in background.





Figure 3c. Scattered passive revegetation (D) on gravel and sands.





Figure 3d. Disturbed area within Blackbutt woodland (I).



Figure 3e. Sedgelands (H) in foreground with Paperbark over dense shrubs (F) to the left in the background and disturbed M-J woodland (A) to the right.

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