

Fauna and Flora Survey/ Vegetation Assessment Of the Boxwood Hill Gravel Pit For The Proposed Construction of a Dam and Catchment



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Introduction/ Executive Summary

The Shire of Jerramungup is currently investigating a potential site for the construction of a new Community dam for the town site of Boxwood Hill. The proposed dam is located within an existing gravel pit located approximately 2km North of the Boxwood Hill town site. The gravel pit is regarded as an historical gravel extraction pit and has not been in use for more than 10 years, there is also little evidence of any rehabilitation activities within the gravel pit which has resulted in the regrowth on the Over-Burden mounds forming their own micro Ecosystems, supporting 10-13 years of native re-vegetation growth.

In addition to the proposed construction of the dam within the existing gravel pit, the Shire will need to clear a further 5.28 Hectares of native vegetation to the East of the gravel pit to increase the catchment capacity for the future viability of the Dam.

In support of any clearing permits that may be required to clear 6 over-burden mounds located within the existing gravel pit and the 5.28 hectares of vegetation to be cleared for the construction of the catchment. Steve Elson (Environmental Officer, Shire of Jerramungup) has conducted a Flora and Fauna Survey/Vegetation Assessment of these mounds and within the proposed catchment site East of the existing gravel pit.

Steve Elson holds a Diploma in Conservation and Land Management and possesses more than 30 years of field based knowledge and experience in research of Threatened Ecosystems and their management. Steve's current projects include a major study on the Breeding Ecology of the Avian Fauna of South-Western Australia, as well as extensive studies on South-West Fauna assemblages and their association with remnant road verge vegetation systems. Steve Elson is also the Author of **Shorebirds of South Western Australia**, which was published in 2017.

The Flora and Fauna Survey/Vegetation assessment for the proposed dam catchment will provide DWER relevant information to aid in their assessment against the 10 clearing principals to which clearing proposals are assessed.

Objectives

The purpose of the Flora and Fauna Survey/Vegetation Assessment was to identify the Ecological components associated with the proposed construction site for the new dam and catchment located within and just East of the existing Boxwood Hill gravel pit. The on ground surveys will also assist in identifying Rare, Threatened and Priority Flora And Fauna that may occur within and beyond the proposed dam construction site.

An integral part of the Flora and Fauna surveys and Vegetation Assessments, was to gather real time information on the current status of the Ecological communities that occur within and beyond the proposed dam catchment site. Further more the surveys will provide vital data to support and compliment the gaps of Knowledge on the Biodiversity that occur within the broader Boxwood Hill region.

Methodology

Flora Survey, Vegetation Assessment of the Boxwood Hill Gravel Pit (Proposed Dam/Catchment Construction Site)

Three survey methods were employed to gather data on the Vegetation communities, floristic components and habitat structure associated with the proposed clearing zones within and beyond the Boxwood Hill gravel pit. The field based surveys and desktop assessment also assisted in the identification of potential sites supporting Rare, Threatened and Priority listed Flora, including Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs).

Survey Method 1. Meandering Style Survey

The meandering style Survey method was employed to gather vital information on the sites vegetation structure, floristic components, topography, soil type, geology, slope and aspect. In addition this on ground survey method would assist in conducting a more effective and detailed assessment on the general health of the Mallee and Sub Mallee habitat systems recorded within and beyond the proposed site.

The meandering survey method was most effective in gathering real time information on the habitat systems surrounding the Boxwood Hill gravel pit.

Proposed Catchment Construction Site Boxwood Hill



Vegetation Communities and Floristic components within the proposed Catchment Zones.

The Vegetation communities and floristic components within the proposed catchment zones were found to support extensive areas of Mallee Eucalypt species over a mixed Shrubland understorey of, *Banksias*, *Grevilleas*, *Hakeas*, *Melaleucas*, *Calothamnus* and *Gastrolobium* species.

In general the vegetation communities were consistent with minimal transitional habitat changes other than micro pockets of several *Banksia* species forming small monoculture habitats of *Banksia falcata* and *Banksia plumose*, these small pockets of stand alone *Banksias* were often scattered and discontinuous.

Within the proposed catchment zone a single population of *Banksia Alliacea* was identified towards the southern section along Circuit road, this species is one of the Key nesting sites for the Western Whipbird *Psophodes nigrogularis*, a search of each individual shrub indicated no evidence of active or inactive nests.

The ground cover vegetation was found to be consistent across the survey zones supporting a mixture of low growing grasses and sedges including several *Lomandra* sp over shallow sandy clay soils interspersed with areas of exposed surface gravel and towards the North Eastern side a slight ridge supporting exposed rock formations.

Note: Refer To Map page 4 to where site photos were taken



Plant Species Recorded Within The Proposed Catchment Zone

Species.

Adenanthos flavidiflorus

Allocasuarina humilllis

Andersonia sp

Banksia alliacea

Banksia falcata

Banksia repens

Banksia media

Banksia drummondii

Banksia plumosa

Callitris roei

Calothamnus quadrifidus

Calothamnus gibbosus

Calothamnus validus

Cassytha sp.

Drosera sp.

Exocarpos sparteus

Eucalyptus platypus

Eucalyptus pleurocarpa

Eucalyptus incrassate

Eucalyptus preissiana

Gastrolobium sp.

Grevillea cagiana

Grevillea fasciculate

Hibbertia sp

Hakea trifurcata

Hakea nitidia

Hakea Laurina

Isopogon sp

Kennidia sp

Lomandra sp

Lambertia inermis

Nuystsia floribunda

Petrophile sp

Patersonia occidentalis

Taxandria spathulata

Xanthorrhoea platyphylla

Orchid Species

Caladenia sp.

Prasophyllum sp

Pterostylis sp

Hakea corymbosa



Survey Method 2. (Sample Sites)

The Second method employed was to measure the individual over-burden mounds and treat each mound as an individual survey site which is very similar to measuring out a single Quadrat site

The advantage of this form of survey method allowed for a much closer examination of all six Over-Burden mounds, thus providing a much clearer picture of the floristic diversity within a small micro-study site. This method also assisted in identifying Biotic and Abiotic features within the landscape, as well as assisting in the overall assessment of the vegetation communities within the Key survey sites and beyond the proposed clearing zones.

Information collected from each site included the plant species, soil type, Upper canopy cover, Mid canopy cover, ground cover vegetation, leaf litter coverage, leaf litter depth, and other relevant observations for each site, including detritus materials.

Over-Burden Mounds Within The Boxwood Hill Gravel pit

Legend
 Populated Places
 Local Government Authority
 State Roads
 Other Roads

Mound 1. = 880m²

Mound 2. = 900m²

Mound 3. = 880m²

Mound 4. = 825m²

Mound 5. = 900m²

Mound 6. = 255m²

Total area to be cleared

= 4640m²



Map Printed from WALGA LÖmap on Thu Apr 23 13:18:51 AWST 2020

Survey Method 3. (Desk Top Assessment)

A desktop assessment was carried out to identify Rare, Threatened and Priority Flora including areas of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) that may occur within 5km of the assessment areas.

Information was sourced from relevant sites including:

1. Naturemap (DBCA 2007) To create a current plant list of species that may occur within the assessment areas.
2. FloraBase (DBCA Current) To create a current plant list supporting common, Rare, Threatened and Priority Flora within the Assessment areas.
3. WALGAs Environmental Planning Tool (current 2020) To identify Rare, Threatened and Priority Flora including potential areas supporting Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs).

Priority Flora And Fauna Associated With The Boxwood Hill Gravel Pit

Legend

- Threatened and Priority Flora
- WA Herbarium Records
- Threatened and Priority Fauna
- Populated Places
- Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province (ec126)
- Community likely to occur within area
- Community may occur within area
- Local Government Authority
- State Roads
- Other Roads



Boxwood Hill Grave Pit

Map Printed from WALGA L00map on Wed Apr 20 13:40:01 AWST 2020

Mound 1.



Over-Burden Mound 1. covers approx. 880m², the vegetation comprises mostly of small shrubs <2m with ground cover vegetation supporting several sedges *Lepidosperma* sp and other grasses. The Over-Burden Mound supports 65% vegetation coverage with exposed areas of gravel and various amounts of dead vegetation mixed with Mallee roots and other larger branches, The Northern face of the mound supports extensive areas of bare gravel.

Mound 2.



Over-Burden Mound 2. Covers approx. 900m², the vegetation comprises mostly of dense understory shrubs with 2 patches of upper canopy Mallee Eucalypt species including *Eucalyptus pleurocarpa* and *Eucalyptus incrassata*, the Western side of the mound supports heathy patches of *Lambertia inermis* and *Banksia plumosa*.

The ground cover vegetation supports extensive areas of sedges and grasses including *Lepidosperma*, *Baumea* sp and various small ground shrubs such as *Daviesia emarginata* *Grevilia caginia*



Mound 3.

Over-Burden Mound 3. Mound 3 supports extensive areas of open gravelly soil mixed with exposed Mallee roots, dead branches as well as active and inactive termite mounds, the vegetation coverage is approx. 50% of mostly patches of understorey vegetation comprising of small shrubs including *Banksia drummondii*, *Grevillea cagiana*, and *Mellalueca sp*.

Close inspection of Mound 3 was found to support 30 specimens of emerging *Pterostylis sp*.



Mound 4.

Over-burden mound 4. Mound 4 supports a vegetation coverage of 70% with most of the vegetation supporting small shrubs including *Banksia Formosa*, *Melaleuca sp*, *Grevillea cagiana*, and several *Gastrolobium sp* including *Gastrolobium latifolium*, the ground vegetation also supported various grasses and sedges and rushes.

The mound was also found to support patches of dead or dying vegetation, comprising mostly of *Banksias* and *Hakeas*.



Over-Burden Mound 5. Mound 5 supports a vegetation coverage of 70%, the upper canopy species include *Eucalyptus Pleurocarpa*, and *Eucalyptus preissiana*, the mid layer vegetation supports populations of *Banksia plumosa*, *Banksia caleyi* and *Lambertia ermis*, the ground cover vegetation supports various grasses and sedges including several populations of Bridle Creeper *Asparagus asparagoides*.

The exposed areas support bare patches of gravelly soils interspersed with dead shrubs and exposed Mallee roots, including active and inactive termite mounds.



Over-Burden Mound 6. Mound 6 supports a vegetation coverage of 50%, dominated with an upper canopy of several Mallee *Eucalypt* species including *Eucalyptus preissiana*, the Northern face of the mound is exposed with little vegetation other than dead branches Mallee roots and a single *Banksia drummondii*.

The western face of the mound supported several *Melaleuca* shrubs, sedges and rushes including *Gastrolobium latifolium*.

Plant Species Recorded Within The 6 Over-Burden Mounds Of the Boxwood Hill Gravel Pit

Species

<i>Acacia biflora</i>	<i>Eucalyptus preissiana</i>	<i>Patersonia occidentalis</i>
<i>Acacia cyclops</i>	<i>Eucalyptus incrassata</i>	<i>Persoonia teretifolia</i>
<i>Acacia saligna</i>	<i>Eucalyptus goniantha</i>	<i>Petrophile squamata</i>
<i>Andersonia caerulea</i>	<i>Eucalyptus pleurocarpa</i>	<i>Pterostylis</i> sp.
<i>Andersonia simplex</i>	<i>Exocarpos</i> sp.	<i>Pimelea</i> sp.
<i>Adenanthos flavidiflorus</i>	<i>Ficinia nodoas</i>	<i>Stylidium</i> sp.
<i>Allocasuarina huegeliana</i>	<i>Gastrolobium punctatum</i>	<i>Scaevola</i> sp.
<i>Banksia repens</i>	<i>Gastrolobium latifolium</i>	<i>Synaphea petiolaris</i>
<i>Banksia drummondii</i>	<i>Gastrolobium parviflorum</i>	<i>Taxandria spathulata</i>
<i>Banksia falcata</i>	<i>Grevillea cagiana</i>	
<i>Banksia plumosa</i>	<i>Hakea laurina</i>	
<i>Banksia caleyi</i>	<i>Hakea ferruginea</i>	
<i>Baumea</i> sp.	<i>Hakea nitidia</i>	
<i>Carpobrotus</i> sp.	<i>Lasiopetalum compactum</i>	
<i>Calothamnus gibbosus</i>	<i>Lambertia inermis</i>	
<i>Calothamnus quadrifidus</i>	<i>Lomandra hastilis</i>	
<i>Conostylis</i> sp.	<i>Lepidosperma</i> sp.	
<i>Cassytha</i> sp.	<i>Isopogon longifolius</i>	
<i>Drosera erythorhiza</i>	<i>Melaleuca araucarioides</i>	
<i>Drosera scorpioides</i>	<i>Melaleuca radula</i>	
<i>Drosera macrantha</i>	<i>Melaleuca</i> sp.	

Flora Survey/ Vegetation Assessment, Results and Discussion for the Proposed construction of a new dam/catchment at the Boxwood Hill Gravel Pit

The key vegetation communities surrounding the proposed dam construction site were of extensive areas of mostly uninterrupted Low *Proteaceous* Dominated Kwongkan Shrublands with a high representation of healthy populations of *Banksia alliacea*, *Banksia plumosa*, *Banksia caleyi*, *Banksia nutans* and *Banksia media*.

The key habitat systems to the North of the proposed dam construction site are of Banksia Shrublands dominated by healthy populations of *Banksia plumosa*.

To the North-East of the site were several areas of exposed rocky outcrops supporting low Shrublands of *Grevilleas*, *Hakeas* and *Acacias* interspersed with grasses and sedges, to the South of the proposed dam construction site are a mixed community of Mallee Shrublands supporting *Banksia media* and *Eucalyptus Pleurocarpa* over open Shrublands interspersed with patches of denser Shrublands of *Melaleucas*, *Isopogons*, *Calothamnus* and various sedges and grasses.

The Shrubland dominated plant communities were found to support significant populations of flowering shrub species including *Banksia nutans*, *Banksia obovata*, *Banksia repens*, *Banksia alliacea*, including several species of low growing *Acacias*, *Melaleucas* and *Grevillia*'s. The ground cover Vegetation was found to support extensive areas of Grasses and Sedges.

During the survey of the 6 overburden mounds no rare, threatened or Priority flora were identified, meandering style surveys were also conducted within the existing gravel pit with a key focus on identifying weed species which may impact on the natural landscapes beyond the existing gravel pit.

During the on ground surveys a single mound of recently introduced earth was located to the North of the existing gravel pit, the mound was found to support an extensive coverage of weeds, including African Love Grass, Bridle Creeper, Cape Weed and several unidentified emerging weeds.

43 native plant species and 8 weed species were recorded growing within the 6 over-burden mounds including the invasive Bridle Creeper *Asparagus asparagoides*.

Observations of the vegetation health within the 6 mounds indicated the potential presence of Phytophthora Dieback, with indicator species such as Banksias and Hakeas presenting as dead or dying.

On the 16th of July 2020 a systematic and detailed meandering survey was conducted within the proposed catchment zone East of the gravel pit. (Refer to Map 1 Page 4) The key Vegetation communities were of upper canopy Mallee Eucalypt species including *Eucalyptus platypus*, *Eucalyptus pleurocarpa*, *Eucalyptus incrassate*, *Eucalyptus preissiana* interspersed with several populations of *Hakea laurina* and *Nuytsia floribunda*. The Mid-layer Vegetation canopy comprised of a diverse mixed understorey of *Banksias*, *Melaleucas*, *Grevilleas*, *Calothamnus* sp *Hakeas* and *Gastrolobium* sp..

The ground cover Vegetation communities were of a mixed variety of sedges and grasses including several species of *Lomandra*, *Patersonia occidentalis* and *Drosera* sp.

The soil types were consistent across the proposed catchment zones which were of gravelly, sandy clay soils to shallow sandy clay soils over gravel deposits including areas supporting exposed surface gravel.

During the Survey of the proposed catchment zones no Rare, Threatened or Priority Flora were identified, several Orchid species were found to be in flower whilst other species were showing evidence of pre emergent leaves, these include *Prasophyllum* sp, *Pterostylis* sp and several *Caladenia* sp.

On Friday the 31st of July 2020 a follow up targeted Flora survey was conducted within the proposed construction site. The key objectives were to search for and identify existing populations of Rare, Threatened and priority Flora, these include: ***Caladenia bryceana* subsp *bryceana*, *Androcalva perlaria*, *Banksia anaton*, *banksia pseudoplumosa*, *Grevillea maxwellii*, *Myoporum cordifolium***. The search activities resulted in none of the above species being located. NOTE that in regards to searching for ***Caladenia bryceana* subsp *bryceana***, this species tends to be more associated with winter wet areas and adjacent to water courses.

Fauna Survey Methodology

In conjunction with the Flora Survey/Vegetation Assessment, the Author has conducted a long term monitoring program on Faunal assemblages that utilize the diverse Mallee and Sub Mallee habitat systems associated with the Boxwood Hill gravel pit, including areas to the North and South of the Boxwood Hill town site.

The long term field based observations and surveys began in October 2007 and form part of a continuous project to gain a greater understanding on Fauna Ecology and their reliance on the natural landscapes across the Jerramungup Shire.

The Key objectives of the Fauna Surveys were to collect field based data on the Faunal assemblages that utilize the Vegetation Communities within and beyond the gravel pit and the proposed catchment area of a new dam.

Several survey methods were employed to assist in identifying the Fauna that live within and surrounding the Boxwood Hill gravel pit, these include:

Surveillance cameras– During 2019, 5 surveillance cameras were placed at strategic locations throughout the Boxwood Hill region, the advantages of this form of survey technique was to gather information on Fauna that utilize the diverse range of Sub-Mallee habitat systems, as well as to monitor the activities of Nocturnal Fauna over a given time frame.

Systematic Searches– This form of Survey technique was the most comprehensive and methodical Fauna Survey employed over a long period (October 2007-November 2019), the advantages of this form of survey technique was the ability to walk across the Landscape in a meandering style fashion using a GPS unit for direction and assistance in covering as much ground as possible.

This on ground meandering survey method allowed for a more detailed examination of Faunal Assemblages that utilize the diverse Mallee-Habitat systems surrounding the Boxwood Hill gravel pit. One of the Key advantages of conducting systematic searches was the ability to monitor Avian breeding behaviour and thus locate active/inactive nests throughout the entire landscape of the Boxwood Hill region.

Desk top Assessment– A desktop assessments was carried out to identify Rare, Threatened or priority Fauna within 5km of the Boxwood Hill gravel pit.

Information was sourced from several sites including:

1. Naturemap (DBCA) To assist in identifying Rare, Threatened and Priority Fauna that may occur within 5km of the proposed dam construction site.
2. WALGAs Environmental Planning Tool (current 2020) To assist in identifying Rare, Threatened and Priority Fauna within 5km of the Boxwood Hill gravel pit.

Avian Species recorded during the Fauna Surveys within 5km of the Boxwood Hill Gravel Pit (October 2007– November 2019)

The meandering style survey method was the most effective survey technique used to gather Field data on Avian Fauna Assemblages that utilize the various habitat systems associated with the Boxwood Hill Gravel Pit. These systematic and methodical surveys assisted in gathering information on the Feeding and breeding ecology of individual Avian Species and their reliance on the vegetation communities across the varied habitat systems associated with the greater Boxwood Hill Region.

The key objectives of the Avian Fauna Surveys were to identify important feeding and breeding sites of Rare, Threatened and Priority Avian species that may utilise habitat systems within and beyond the proposed dam/catchment construction site.

Avian Fauna List

Banded Lapwing *Vanellus tricolor* rbsv

Black-fronted Dotterel *Euseyornis melanops* rb

White-faced Heron *Egretta novaehollandiae* rb

Emu *Dromaius novaehollandiae* rb

Malleefowl *Leipoa ocellata* rb

Painted Button-Quail *Turnix varius* rb

Little Button Quail *Turnix velox* r

Stubble Quail *Coturnix pectoralis* rb

Black-shouldered Kite *Elanus axillaris* rb

Spotted Harrier *Circus assimilis* rb

Collared Sparrowhawk *Accipiter cirrocephalus* rb

Brown Goshawk *Accipiter fasciatus* rb

Little Eagle *Hieraetus morphnoides* rv

Wedge-tailed Eagle *Aquila audax* rb

Nankeen Kestrel *Falco cenchroides* rb

Brown Falcon *Falco berigora* rb

Australian Hobby *Falco longipennis* cv

Peregrine Falcon *Falco peregrinus* rv

KEY

rbsv = Recorded Breeding Seasonal Visitor

rb = Recorded Breeding

rv = Rare Visitor

cv = Common Visitor

rm = Rare Migrant

Southern Boobook *Ninox novaeseelandiae* rb

Eastern Barn Owl *Tyto javanica* rb

Tawny Frogmouth *Podargus strigoides* rb

Australian Owlet- Nightjar *Aegotheles cristatus* rb

Spotted Nightjar *Eurostopodus argus* rv

Crested Pigeon *Ocyphaps lophotes* rb

Common Bronzewing *Phaps chalcoptera* rb

Brush Bronzewing *Phaps elegans* rb

Carnaby's Black-Cockatoo *Calyptorhynchus latirostris* cv

Galah *Eolophus roseicapilla* rb

Purple-crowned Lorikeet *Glossopsitta porphyrocephala* cv

Australian Ringneck *Barnardius zonarius* rb

Red-capped Parrot *Purpureicephalus spurius* rb

Regent Parrot *Polytelis anthopeplus* rb

Elegant Parrot *Neophema elegans* rb

Pallid Cuckoo *Cuculus pallidus* rb

Fan-tailed Cuckoo *Cacomantis flabelliformis* rb

Horsfield's Bronze Cuckoo *Chrysococcyx basalis* rb

Shinning Bronze Cuckoo *Chrysococcyx lucidus* subspecies *plagosus* rb

Laughing Kookaburra *Dacelo novaeguinea* rb

Sacred Kingfisher *Todiramphus sanctus* rbsv

Rainbow Bee-eater *Merops ornatus* rv

Splendid Fairy-Wren *Malurus splendens* subspecies *splendens* rb

Blue-breasted Fairy-wren *Malurus pulcherrimus* rb

Southern Emu-wren *Stipiturus malachurus* subspecies *westernensis* rb

White-browed Scrubwren *Sericornis frontalis* rb

Shy Heathwren *Hylacola cauta* subspecies *whitloki* rb

Rufous Fieldwren *Calamanthus campestris* rb

Weebill *smicronis brevirostris* subspecies *occidentalis* rb

Western Gerygone *Gerygone fusca* subspecies *fusca* rb

Inland Thornbill *Acanthiza apicalis* rb

Yellow- Rumped Thornbill *Acanthiza chrysorrhoa chrysorrhoa* rb

Spotted Pardalote *Pardalotus punctatus* subspecies *xanthopyge* rb

Striated Pardalote *Pardalotus striatus* subspecies *substriatus* rb

Red Wattlebird *Anthochaera carunculata* subspecies *woodwardi* rb

Western Wattlebird *Anthochaera lunulata* rb

Yellow-throated Miner *Manorina flavigula* subspecies *wayensis* rb

Singing Honeyeater *Lichenostomus virescens virescens* rb

Purple-gaped Honeyeater *Lichenostomus cratitius* subspecies *occidenalis* rb

Brown-Headed Honeyeater *Melithreptus brevirostris* subspecies *magnirostris* rb

Brown Honeyeater *Lihmera indistincta* rb

New-Holland Honeyeater *Phylidonyris novaehollandiae* subspecies *longirostris* rb

White-Cheeked Honeyeater *Phylidonyris nigra* subspecies *gouldi* rb

Tawny-Crowned Honeyeater *Phylidonyris melanops melanops* rb

Western Spinebill *Acanthorhynchus superciliosus* rb

White-fronted Chat *Epthianura albifrons* rb

White-Browed Babbler *Pomatostomus superciliosus* rb

Western Whipbird *Psophodes nigrogularis* rb

Varied Sittella *Daphoenositta chrysoptera* subspecies *pileata* rb

Golden Whistler *Pachycephala pectoralis* subspecies *fuliginosa* rb

Rufous Whistler *Pachycephala rufiventris rufiventris* rb

Grey-Shrike Thrush *Colluricincla harmonica* subspecies *rufiventris* rb

Restless Flycatcher *Myiagra inquieta inquieta* rb

Magpie-lark *Grallina cyanoleuca cyanoleuca* rb

Grey Fantail *Rhipidura fuliginosa* subspecies *preissi* rb

Willie Wagtail *Rhipidura leucophrys leucophrys* rb

Red-capped Robin *Petroica goodenovi* rb

Western Yellow Robin *Eopsaltria griseogularis* rb

Southern Scrub-robin *Drymodes brunneopygia* rb

Black-faced Cuckoo-shrike *Coracina novaehollandiae* subspecies *melanops* rb

White-winged Triller *Lalage sueuril* subspecies *tricolor* rb

Black-faced Woodswallow *Artamus cinereus* rb

Dusky Woodswallow *Artamus cyanopterus* subspecies *perthi* rb

Grey Butcherbird *Cracticus torquatus* subspecies *leucopterus* rb

Pied Butcherbird *Cracticus nigrogularis* subspecies *picatus* rv

Grey Currawong *Strepera versicolor* subspecies *plumbea* rb

Australian Magpie *Gymnorhina tibicen* subspecies *dorsalis* rb

Australian Raven *Corvus coronoides* subspecies *perplexus* *rb*

Australian Pipit *Anthus novaeseelandiae* subspecies *australis* *rb*

Mistletoebird *Diccaeum hiruninaceum* *rb*

White-backed Swallow *Cheramoeca leucosterna* *rb*

Welcome Swallow *Hiundo neoxena* subspecies *carteri* *rb*

Tree Martin *Hirundo nigricans* subspecies *neglecta* *rb*

Rufous Songlark *Cincloramphus mathewsi* *rbsv*

Brown Songlark *Cincloramphus cruralis* *rbsv*

Silvereye *Zosterops lateralis* subspecies *chloronotus* *rb*

Red-Eared Firetail *Stagonopleura oculata* *rb*

Water Bird Survey of The Boxwood Hill Dam and Associated Water Course (October 2007– November 2019)

In support of the Avian Fauna surveys carried out within the dry land habitat systems associated with the proposed clearing zones, long term monitoring surveys were also carried out within areas supporting seasonally flooded creeks, rivers and dams.

Towards the North- East of The proposed clearing zones there is a permeant dam and minor creek system, (Refer to map page 22). The water levels within the creek system depend on rainfall runoff and major summer rainfall events which often fill the creek system to a level that supports breeding populations of both the Hoary Headed Grebe and Black Throated Grebe. If the creek system remains full for most months of the year as it was during 2016 and 2017, which resulted from a major summer rainfall event, other water bird species were observed to congregate along the creek system to loaf, feed and breed.

Since Surveys began in October 2007 until November 2019 a number of water bird species were recorded utilizing both the Dam and the Creek System, these include:

Avian Species

Hoary Headed Grebe	<i>Poliiocephalus poliocephalus</i>	rbsv	<u>Key</u>
Black Throated Grebe	<i>Tachybaptus novaehollandiae</i>	rbsv	rbsv = Recorded Breeding Seasonal Visitor
Australian Pelican	<i>Pelecanus conspicillatus</i>	rv	rb = Recorded Breeding
Black Swan	<i>Cygnus atratus</i>	rv	rv = Rare Visitor
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	cv	cv = Common Visitor
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	cv	rm = Rare Migrant
Australian Shelduck	<i>Tadorna tadornoides</i>	rb	
Australian Wood Duck	<i>Chenonetta jubata</i>	rb	
Australasian Shoveler	<i>Spatula clypeata</i>	rv	
Pacific Black Duck	<i>Anus superciliosa</i>	rb	
Grey Teal	<i>Anus gracilis</i>	rb	
Chestnut Teal	<i>Anus castanea</i>	rb	
Pink Eared Duck	<i>Malacorhynchus membranaceus</i>	rbsv	
Hardhead	<i>Aythya australis</i>	rv	
Blue-Billed Duck	<i>Oxyura australis</i>	rv	
Musk Duck	<i>Biziura lobate</i>	rv	

Black -Tailed Native Hen	<i>Tribonyx ventralis</i>	rv
Spotless Crake	<i>Zapornia tabuensis</i>	rv
Black– Winged Stilt	<i>Himantopus leucocephalus</i>	rv
Red Capped Plover	<i>Charadrius ruficapillus</i>	rv
Red Kneed Dotterel	<i>Erythrogonyx cinctus</i>	rv
Common Sandpiper	<i>Actitis hypoleucos</i>	rm
Common Greenshank	<i>Tringa nebularia</i>	rm
Wood Sandpiper	<i>Tringa glareola</i>	rm
White Faced Heron	<i>Egretta novaehollandiae</i>	rbsv
Rufous Night Heron	<i>Nycticorax caledonicus</i>	rv
Pacific Heron	<i>Ardea pacifica</i>	rm
Yellow Billed Spoonbill	<i>Platalea flavipes</i>	rv
Australian Ibis	<i>Threskiornis moluccus</i>	cv
Straw Necked Ibis	<i>Threskiornis spinicollis</i>	cv

Water Bird Survey Of The Boxwood Hill Dam and Associated Water Course



Populated Places Local Government Authority State Roads Other Roads

Map Printed from WALGA LGmap on Mon Aug 03 10:52:46 AWST 2020

Reptile, Frog and Mammal Survey of the Boxwood Hill Gravel Pit

From October 2007 until November 2019 whilst conducting Avian Fauna surveys of the Boxwood Hill Gravel pit and surrounding areas, Reptile and Frog Surveys were conducted within abandoned stick ant nests, graded soil heaps and amongst fallen timber and exfoliated surface rocks including within fallen leaf litter.

Reptile Species List

Western Marbled Gecko *Christinus marmoratus* rb

South-western Clawless Gecko *Crenadactylus ocellatus ocellatus* rb

Wheatbelt Stone Gecko *Diplodactylus granariensis granariensis* r

Orange-eyed Southwestern Spiny-tailed Gecko *Strophurus spinigerus inornatus* r

South-Western Sandplain Worm Lizard *Aprasia repens* r

Striated Worm Lizard *Aprasia striolata* r

Fraser's Delma *Delma fraseri* r

Burton's Legless Lizard *Lialis burtonis* r

Southern Scaly Foot *Pygopus lepidopodus* r

Wheatbelt Spotted Sand Dragon *Ctenophorus maculatus griseus* nr

Western Bearded Dragon *Pogona minor minor* rb

Eastern Heath Dragon *Rankinia adelaidensis chapmani* r

Southern Heath Monitor *Varanus rosenbergi* rb

South-Western Cool Skink *Acritoscincus trilineatus* r

Odd-striped Ctenotus *Ctenotus impar* r

Jewelled Sandplain Ctenotus *Ctenotus gemmula* r

Key

r = Recorded

rb = Recorded Breeding

nr = Not Recorded

Red-Legged Ctenotus *Ctenotus labillardieri* nr

South-Western Crevice Skink *Egernia napoleonis* r

King's Skink *Egernia kingii* nr

Four-toed Mulch Skink *Hemiergis peronii peronii* r

South-Western Five-toed Lerista *Lerista microtis microtis* r

South-Western Four-toed Lerista *Lerista distinguenda* r

Common Dwarf Skink *Menetia greyii* r

Shrubland Pale-flecked Morethia *Morethia obscura* r

Western Bluetongue *Tiliqua occipitalis* r

Western Bobtail *Tiliqua rugosa rugosa* rb

South-Western Blind Snake *Ramphotyphlops australis* r

Southern Carpet Python *Morelia spilota imbricate* r

Bardick *Echiopsis curta* r

Crowned Snake *Elapognathus coronatus* r

Tiger Snake *Notechis scutatus* r

Gould's Hooded Snake *Parasuta gouldii* r

Black-backed Hooded Snake *Parasuta nigriceps* r

Dugite *Pseudonaja affinis affinis* r

Frog Species List

Quacking Frog *Crinia Georgiana* *r*

Bleating Froglet *Crinia pseudinsignifera* *r*

Western Banjo Frog *Limnodynastes dorsalis* *r*

Turtle Frog *Myobatrachus gouldii* *r*

White-footed Trilling Frog *Neobatrachus albipes* *nr*

Kunapalari Trilling Frog *Neobatrachus kunapalari* *nr*

Spotted-thighed Frog *Litoria cyclorhyncha* *rb*

Mammal Species List

Short-beaked Echidna *Tachglossus aculeatus* *r*

Western Pigmy-possum *Cercartetus concinnus* *rb*

Honey Possum *Tarsipes rostratus* *r*

Western Grey Kangaroo *Macropus fuliginosus* *rb*

Western Brush Wallaby *Macropus Irma* *r*

Western Spotted Quoll *Dasyurus geoffroii* *nr*

Introduced Species

House Mouse *Mus musculus* *rb*

Fox *Vulpes vulpes* *rb*

Cat *Felis catus* *r*

Rabbit *Oryctolagus cuniculus* *rb*

Fauna Survey Results and Discussion

Fauna Surveys of the Boxwood Hill gravel pit and surrounding areas were first carried out in October 2007 and form part of a continuous Observation/Monitoring program in support of the Shire of Jerramungup's Fauna Surveys Data base.

Surveys were carried out throughout all months of the year and were generally applied when conducting seed collecting activities for revegetation projects within the Shires Road Reserves.

The Author conducted nocturnal surveys during peak flowering periods with a key focus on identifying and recording the feeding behaviour of Western Pigmy Possum *Cercartetus concinnus* and the Honey Possum *Tarsipes rostratus*, these surveys were concentrated within habitats supporting flowering Banksia species.

Both the Western Pigmy Possum and Honey Possum were recorded on numerous occasions along the Firebreak/ access track surrounding the Boxwood Hill gravel pit and during mid morning search activities where a number of Western Pigmy Possums were found in a state of Torpor within the abandoned nests of New Holland Honeyeaters, White-Browed Scrub-Wrens and White-Browed Babblers.

The Author has conducted long-term monitoring programs on the Avian Fauna assemblages within the Greater Boxwood Hill Region, which covers areas just North of the Boxwood Hill Town site, (Encompassing the Boxwood Hill gravel pit) South to Millers Point and the associated riparian zones of the Pallinup River complex. The surveys were carried out between October 2007 and November 2019.

Fauna surveys carried out within 5km of the Boxwood Hill Gavel pit indicated a high presence of Malleefowl sightings and healthy breeding populations of the Western Whipbird *Pso-phodes nigrogularis nigrogularis*.

Between October 2007 and November 2019, the Author recorded 16 active Western Whipbird Nests located within proximity to the existing gravel pit. All nests were found within *Banksia caleyi*, *Banksia nutans* and *Banksia allieacea*.

The *Proteaceous* rich plant communities surrounding the Boxwood Hill gravel pit were found to support a high degree of Rare, Threatened and Priority Fauna including:

1. **Carnaby,s Black Cockatoo**— flocks of between 60 and 150 birds regularly visit the area feeding on the seeds of various *Banksias* including *Hakeas* such as *Hakea corymbosa*
2. **Malleefowl**— a single active Malleefowl was located just North of the Boxwood Hill gravel pit, sightings of individual birds were mostly on fire breaks and the edges of gravel roads.
3. **Western Whipbird** —The Author has recorded between 30 and 40 breeding pairs within a 5km radius of the Boxwood Hill gravel pit
4. **Peregrine Falcon** - The Peregrine Falcon has been observed on many occasions, mostly after the breeding season where both adults and juvenile birds have been observed hunting over the Mallee habitats surrounding the Boxwood Hill gravel pit.
5. **Western Brush Wallaby** - The Western Brush wallaby has been recorded within the Dense Mallee Shrublands and along Road verges and Firebreaks, mostly in the early mornings.

In conclusion, the Greater Boxwood Hill Region supports over 170 Avian species with many species relying on the relatively intact Vegetated corridor network system that runs North from the Pallinup River to Just North of the Boxwood Hill Town site .

Threatening and Potential Threatening processes identified within and beyond the proposed Dam Construction Site of The Boxwood Hill Gravel Pit

Throughout the entire process of collecting field based data on the Flora/Fauna and Vegetation systems within and beyond the site, a number of threatening and potential threatening processes were identified, these include.

1. The illegal dumping of garden waste, Industrial/household rubbish, Asbestos, contaminated soils
2. Fire threats, either deliberate or as a result of lightning strike pose a major threat to the Regions Biodiversity.
3. Trail-bikes and off road vehicles were regularly traversing throughout the gravel reserve and along external fire breaks surrounding the Boxwood Hill Gravel Pit.
4. Feral animals, predominantly Foxes and Cats were evident across all landscapes within and beyond the Boxwood Hill Gravel Pit.
5. Human recreational activities and increased animal activities moving between Agricultural lands and the Natural Landscapes increase the risk of spreading Dieback. During the survey period field observations had shown that Emu and Western Grey Kangaroo populations were in high numbers with many individuals drinking from perched water bodies(potentially contaminated sites).
6. Weed Incursions pose a major threat to all natural Landscapes including the *Proteaceous* rich plant communities that surround the Boxwood Hill Gravel Pit



Increased Feral animal activity associated with Low Heath Vegetation communities have the potential to destroy entire Faunal Assemblages that rely on these systems.



Perched water bodies present a major threat in harbouring *Phytophthora* pathogens, the spores can be transferred to uninfected areas with the potential of destroying entire Vegetation Communities.

Conclusion and Recommendations

Based on the extensive Flora Surveys / Vegetation Assessments and the long term monitoring programs of Faunal species utilizing the diverse habitat systems within and surrounding the Boxwood Hill gravel pit it was found that the *Proteaceous* rich Mallee and Sub-Mallee habitat systems surveyed were in excellent condition with very minimal fragmentation except for Agricultural lands , minor roads and firebreaks.

Weed Incursions were limited to areas of disturbed soils, mostly associated with access tracks and fire breaks. The only significant weed problems were associated with the dumping of soil heaps within the existing Boxwood Hill Gravel Pit

No Rare, Threatened or Priority Flora and Fauna were identified within the 6 Over-Burden Mounds.

It is recommended that the **Key Recommendations** be implemented to manage and maintain the Ecological integrity of the Natural Land scapes associated with and surrounding the Boxwood Hill Gravel Pit

1. Prior to any earth moving operations within the proposed clearing zones associated with the construction of the new dam, it is recommended that all staff undertake training (Green Card) in Dieback hygiene, as well as training in working in Environmentally sensitive areas.
2. The Shire of Jerramungup in consultation with other key stake holders to develop a workable Dieback management plan, in support of the Regions current Environmental Management standards/practices.
3. Signage to be placed at all entry points within the proposed dam construction site indicating the impacts of Dieback on the Regions Biodiversity.
4. Prior to any clearing operations, a suitably Qualified and experienced person in Fauna management (observer) to be in place to assist in the recovery of any Fauna that may be impacted on during any earth moving operations.
5. Prior to any site rehabilitation/revegetation, to consult with a Fauna specialist to look at promoting/increasing suitable habitats for Rare, Threatened and Priority Fauna

Limitations

This report is based on the results of an extensive on ground systematic Flora and Fauna Survey and Vegetation Assessment within and beyond the proposed dam/catchment construction site at the Boxwood Hill gravel pit .

All research and survey activities were carried out by the Author and work colleague Jamie Turner , The Key focus was to assess the Ecological assets within and beyond the Boxwood Hill gravel pit.

All care and efforts were made to identify the Floristic components within all survey sites, however the timing of the surveys in relationship to various plant species not presenting for clear identification allowed for only 70-80 % of all plant species to be identified within the 6 Over-Burden mounds and the proposed catchment clearing zone.

In regards to the Fauna Surveys only observation and Monitoring methodologies were employed to gather information on Faunal assemblages that utilize the extensive Habitat systems within and surrounding the Boxwood Hill gravel pit.

It should be noted that even though Fauna surveys were carried out over a lengthy time period from October 2007 to November 2019, a more intrusive assessment would have required extensive resources and assets i.e. Pit traps, Cage Traps to assist in identifying Fauna not recorded through the employment of the observation and monitoring methodologies.

The Author of this report has over 30 years of field based knowledge and experience, working in various fields of Environmental Management with a key focus on Threatened Ecosystems of South-Western Australia, in support of Steve's work he is currently undertaking training in all aspects of plant identification.

Jamie Turner (Shire of Jerramungup) assisted with the Flora identification process and has a keen interest in Flora of the Great Southern and is currently completing his Diploma in Conservation and Land Management with a key focus on Plant Identification.

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