

**Appendix F2  
Habitat assessment for  
Conservation Significant  
Fauna, Happy Valley**



Species	W'lfe Cons Act	EPBC Act	Biology	Survey results
Barking Owl (south-west sub-species) <i>Ninox connivens connivens</i>	Priority 2	Not listed	<i>Ninox connivens connivens</i> inhabits open woodlands and forest edge habitats where forests adjoin farmlands, effectively creating an open farmland-woodland mosaic, and riparian vegetation. Home range of pairs approx 2000 ha. Clutch size is 1-3. Breeding occurs in July-Sept. Habitat preference is strongly biased towards areas that provide a high density of large trees greater than 60 cm diameter and a high density of hollow trees of a range of sizes, including large hollows greater than 15 cm diameter which are suitable nesting places for Barking Owls. Diet is primarily insects the in nonbreeding season with birds and mammals, particularly small gliders and rabbits, taken when the owls are breeding.	Not recorded during field surveys but possibly present as suitable habitat occurs on site.
Baudin's Black Cockatoo <i>Calyptorhynchus baudinii</i>	Schedule 1	Vulnerable	Baudin's Cockatoo is endemic to a 2,000 km <sup>2</sup> area of the humid and sub-humid zones of south-west Western Australia. The distribution of Baudin's Cockatoo is generally contained within the 750 mm isohyet of average annual rainfall. Baudin's Cockatoos are predominantly found in forested areas. The species is locally resident, but at the end of breeding season, around January, they tend to move away from the breeding area and form flocks that move in response to changing food sources. Baudin's Cockatoo nests in mature trees such as Marri, Jarrah and Wandoo. The Cockatoos nest in hollows 30 – 40cms in diameter and 30cms deep.  Baudin's Cockatoo mainly feed on the seeds of Marri, as well as seeds from Banksia, Hakea, Jarrah, and Dryandra species. They also feed on invertebrate larvae from galls and under dead bark. Baudin's Cockatoo do not eat seed from Pinus plantations, but they do feed on apple and pear seeds from orchards.	In the 1999 survey, there were no recorded sightings of Baudin's Black Cockatoos. In the 2004 survey, four small flocks were observed; two flocks were flying overhead, whilst the other two were observed feeding in Jarrah, Marri and Banksia grandis. Another mixed flock of Carnaby's and Baudin's Black Cockatoos were seen feeding and roosting in Jarrah. In 2004, 290 potential nesting hollows were recorded.
Bilby* <i>Macrotis lagotis</i>	Schedule 1	Vulnerable	Once occupied habitat ranging from Eucalyptus and Acacia woodlands in the wheatbelt of WA to Triodia grasslands in the desert regions. Bilbies are now only found in areas where foxes do not occur or are not abundant, including mulga scrub, hummock grasslands and along drainage or salt lake systems. Require sandy or loamy soil in which to burrow.	Not recorded and unlikely to occur within the project area.
Brush or Black gloved Wallaby <i>Macropus irma</i>	Priority 4	Not listed	The Brush Wallaby is distributed across the south-west of Western Australia from north of Kalbarri to Cape Arid. Optimum habitat for this species is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets.  The Brush Wallaby is a grazer, feeding on grasses and herbs. The breeding season has not been defined accurately but young are born some time from April to May, emerging from the pouch in October or November.	Sighted during the 1999, 2004 and September and November surveys.

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<p>Brush tailed Phascogale <i>Phascogale tapoatafa</i></p>	<p>Schedule 1</p>	<p>Not listed</p>	<p>The range of the Brush tailed Phascogale has been reduced by 50%, mainly by agricultural clearing and deforestation for gold mining operations. The Brush tailed Phascogale is the most arboreal of the dasyurids; 95% arboreal, the Brush-tailed Phascogale lives in a variety of forest and woodland habitats having a reliable annual rainfall within the range of 500 to 2000 mm but its preferred habitat is open dry sclerophyll forest with little ground cover.</p> <p>Brush tailed Phascogale feeds mostly on arthropods, but will also eat other invertebrates, nectar and sometimes small invertebrates. The female will forage over an area of 30- 40 ha.</p> <p>Females have exclusive territories of approximately 20 – 60 ha., while males have overlapping territories of up to 100ha. They nest and shelter in tree hollows with entrances 2.5 – 4cm wide and use many different hollows over a short time span.</p>	<p>In the 1999 survey, there were four sightings of the Brush tailed Phascogale in survey sites 1 &amp;2. Both these sites lie within the Happy Valley proposal site. In the 2004 survey, there were no sightings of the Phascogale. In 2004 survey, one trapping occurred in the Control South site. There were no sightings or trappings in the Happy Valley Proposal site.</p>
<p>Carnaby's Black-Cockatoo <i>Calyptorhynchus latirostris</i></p>	<p>Schedule 1</p>	<p>Endangered</p>	<p>Carnaby's Cockatoo is endemic to south west of Western Australia. They usually breed in the Wheatbelt in areas receiving 300mm to 750mm annual rainfall. During the non - breeding season, they disperse to higher rainfall coastal areas of the south west of Western Australia to feed. Recently there is evidence to suggest that there has been a shift in its breeding behaviour, with a good number of nests reported in the south west jarrah/marri forests and even on the coastal plain. Carnaby Cockatoos have been seen breeding in the Collie area (PC Bamford 2008), so Happy Valley could be a potential breeding area. Breeding usually occurs mid-winter to early spring.</p> <p>During breeding, Carnaby's Black Cockatoo occur in uncleared, remnant areas of eucalyptus woodlands, principally Salmon Gums or Wandoo and shrubland or kwongan heath, dominated by Hakea, Dryandra and Banksia species. After breeding, the cockatoos move to higher rainfall areas which are mainly heath, Banksia woodland and /or introduced Pinus plantations. Carnaby's Black Cockatoo feed on Proteaceous species of plants from coastal heaths and shrublands including Banksia, Dryandra, Hakea, Grevillea, Allocasuarina, Eucalyptus and Pinus plantations. They also feed on the larvae of wood boring moths and weevils found within the flowers and fruit of Banksia species.</p>	<p>In 1999, a flock was seen in the proposed site. In 2004, a small flock of 15 were sited flying over the site; another flock of 80 was recorded feeding on the ground in a paddock and on Marri; mixed flock of Carnaby's and Baudin's Black Cockatoos were recorded roosting and feeding in Jarrah. In the 2007 survey, Carnaby's Black Cockatoos were sited both in September and November; a flock of 15 were sighted feeding on <i>C. haematoxylon</i>, and a further flock of 52 were feeding in a paddock adjacent to the proposed site.</p>
<p>Cattle Egret <i>Ardeola ibis</i></p>	<p>Not listed</p>	<p>Marine; Migratory</p>	<p>Often seen with herds of cattle. Usually associated with moist pastures with tall grass, shallow open wetlands and margins and mudflats.</p>	<p>Not recorded and unlikely to occur within the project area.</p>
<p>Chuditch <i>Dasyurus geoffroii</i></p>	<p>Schedule 1</p>	<p>Vulnerable</p>	<p>Chuditch is restricted to the south-west of Western Australia. The major portion of the remaining populations occurs in Jarrah (<i>Eucalyptus marginata</i>) forests, but they are patchily distributed and at low densities. There are also records from drier woodland and mallee shrubland in the wheatbelt. Riparian vegetation appears to support higher densities of Chuditch. Chuditch are opportunistic feeders, predominantly insects and other large invertebrates. Dens are located in hollow logs or burrows. The jarrah woodland together with the riparian habitat found in the HV proposal area increases the potential of chuditch using this area. Clearing of the site might contribute to the increasing low densities found in the vicinity</p>	<p>9 sighted during the 1999 survey (sightings/trappings), which include Gwindinup area. None recorded since.</p>

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Crested Shrike-tit <i>Falcunculus frontatus</i>	Schedule 1	Vulnerable; Migratory	<i>Falcunculus frontatus</i> occupy eucalypt woodlands and forests. The race <i>leucogaster</i> is confined to southwestern WA. It is largely an insectivore; it also feeds on spiders and other invertebrates and occasionally takes plant matter such as fruit or seeds. Breeding occurs from August through January and 2-3 eggs are laid. The nest is a deep cup or cone woven from grass fibres and strips of bark, typically placed in a vertical fork high in a eucalypt tree or sapling. The Crested Shrike-tit is a diurnal bird that occupies large territories during most of the year.	Not recorded in field surveys but possibly present in low densities (some suitable habitat present).
Forest red – tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	Schedule 1	Not listed	The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and sub-humid zones of Western Australia. They inhabit the dense Jarrah, Karri and Marri forests receiving more than 600 mm of annual average rainfall. Typical habitats in which they tend to occur have an understorey of Bull Banksia ( <i>Banksia grandis</i> ), Snottygobble ( <i>Persoonia longifolia</i> ), Sheoak ( <i>Allocasuarina fraseriana</i> ) and <i>Dryandra</i> spp., with scattered Blackbutt and Wandoo. They nest in the large hollows of Marri, Jarrah and Karri. In Marri, the nest hollows range from 8-14m above ground, the entrance is 12–41cm in diameter and the depth is 1to 5 m. Eggs laid on wood chips at the bottom of the hollow in October-November; clutch 1 (rarely 2).  The diet of the Forest Red tailed cockatoo consist of 90% of seeds form the Marri and Jarrah. Other species used for feeding are Blackbutt, Albany Blackbutt, Forest sheoak, Snottygobble and non indigenous plants including Cape Lilac.	In the 1999 survey, flocks were observed on sites 1 & 2 which lie within the proposed area. Sightings occurred in both August and December. There were no sightings of the Forest Red - tailed Black Cockatoo in 2004, but there were 290 potential nesting hollows recorded, this was not exhaustive. In 2007, 10 Forest Red tailed Black Cockatoos were sited feeding on <i>C. haemotylon</i> over several days
Fork-tailed Swift <i>Apus pacificus</i>	Not listed	Migratory	Breeds in the north-east and mid-east Asia and winters in Australia and southern New Guinea. Usually arrives in south-west in late December and leaves by late April. Uncommon to moderately common.	Not recorded but probably infrequent and entirely aerial visitor.
Glossy Ibis <i>Plegadis falcinellus</i>	Not listed	Marine; Migratory	Recorded in fresh water swamps in most of WA but rare south of the Kimberley. Feeds in small flocks in shallow water and in mud flats. Nest in bushes or trees. Often breeds in colonies mixed with Straw-necked and Sacred Ibises. Diet of frogs, snails, spiders and aquatic insects.	Not recorded and unlikely to occur within the project area.
Great Egret <i>Egretta alba</i> or <i>Ardea modesta</i>	Not listed	Marine; Migratory	A common migratory species, being widespread in areas where there are permanent or temporary wetlands, flooded pastures, dams, mudflats, mangroves and reefs. Diet of frogs, snails, spiders and aquatic insects.	Not recorded and unlikely to occur within the project area.
Marsh Sandpiper <i>Tringa stagnatilis</i>	Not listed	Marine; Migratory	Uncommon. Salt and freshwater. Breeds in Siberia	Not recorded and unlikely to occur within the project area.
Masked Owl (southern sub-species) <i>Tyto novaehollandiae novaehollandiae</i>	Not listed	Not listed	Found in dry open-forest, with preference for mosaic country. Distributed from Yanchep and east to Yealering and south to Albany. Generally uncommon in areas other than Karridale and Manjimup. High site fidelity. Roost by day inside the large hollows of old eucalypts. Home ranges estimated 1000-1200 ha. Breeds August-November. Diet includes non-native rodents, other small terrestrial mammals and small birds.	Not recorded in any of the field surveys but possibly present.
Migratory waterbirds	n.a.	n.a.	Typical requirements are areas of permanent or temporary water with fringing vegetation and/or trees.	Few species recorded in low numbers in nearby wetlands.

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<i>Mormopterus</i> sp. ( <i>M. planiceps</i> , long penis form).	Not Listed	Not Listed	Occur in dry sclerophyll forest and woodland. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Solitary and probably insectivorous.	Not recorded during field surveys but likely to be present as suitable habitat occurs on site.
Peregrine Falcon <i>Falco peregrinus</i>	Schedule 4	Not listed	Wide range of habitats – woodlands, forest, open heath and grassland. Habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. Feeds almost entirely on small and medium sized birds. Also feeds on rabbits, and other small invertebrates. Uncommon.	Sighted during the 1999 survey (included Gwindinup area)
Quenda <i>Isodon obesulus fusciventer</i>	Priority 4	Not listed	<p>The distribution of the Quenda has declined although the species persists in the southwest corner of Western Australia, including the Swan Coastal Plain. It prefers a sandy soil, with scrubby, often swampy, vegetation with dense cover up to one metre high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting Jarrah and Wandoo forests are usually associated with watercourses. Quendas will thrive in more open habitat subject to exotic predator control. Nests consists of a heap of ground litter over a shallow depression providing an internal chamber with loose regions at both ends for entry and exit. It is usually concealed next to or under logs, shrubs or piles of debris. Home ranges vary with population density, and range from 5-9 ha for males and 1-6 ha for females. Quenda are opportunistic breeders, breeding typically occurs between June and September and gestation period is 12-15 days. They can produce as many as three litters in a year, which can vary from one to four young, depending on the availability of water and food in the area. They may live up to five years.</p> <p>The quenda is omnivorous. The diet includes invertebrates (including earthworms, adult beetles and their larvae), underground fungi, subterranean plant material, and very occasionally, small vertebrates.</p>	In the 1999 survey, 3 Quenda were recorded on sites 2 & 4 which lie in the HV Project area. A further individual was observed in Site1, also in the HV site. Another two were sighted on survey site 3, which lies outside the HV area but is in the locality in 2004, 3 Quenda were cage trapped. In the 2007 survey, Quenda were sighted, also there were signs of foraging.
Rainbow Bee-eater <i>Merops ornatus</i>	Not listed	Marine; Migratory	<p>The Rainbow Bee-eaters are numerous and across a wide range of habitats – it is their migratory patterns which give the species its significant conservation status. The birds are distributed across much of mainland Australia and several near-shore islands. Habitats include open woodlands and shrublands (mainly Mallee), open forests (usually dominated by eucalyptus) and riparian, floodplain or wetland vegetation assemblages. The insect diet is mainly bees and wasps, though other insects are eaten – beetles, moths, butterflies, dragon flies, flies and ants.</p> <p>The populations of Rainbow Bee eater in south of Australia are migratory, migrating to Northern Australia, Papua New Guinea and Indonesia from February to April and returning to their southern breeding grounds in early spring. Breeding occurs through the months of August to January, excavating breeding tunnels in soft material e.g. sand of banks, cliff and quarry faces and riparian habitats.</p>	Sighted during the 1999, 2004 and November 2007 surveys.
Rakali or Water Rat <i>Hydromys chrysogaster</i>	Not listed	Not listed	Widely distributed around Australia and occurs in fresh to brackish waters in south-west of WA where its main prey items, including molluscs and crustaceans are found. Nests are constructed in logs or tunnels dug into banks.	Not recorded during field surveys but possibly present. Some suitable habitat occurs on site.

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Red-eared Firetail <i>Stagonopleura oculata</i>	Not listed	Not listed	Found in the forests and coastal thickets of south-western Australia. Preference for dense stream-side vegetation.	Not recorded and habitat not found in site area.
Skink <i>Lerista microtis</i>	Not listed	Not listed	Recorded from the area bounded by Dwellingup, Collie, Margaret River and Bremer Bay.	Not recorded during field surveys and probably not present
South West Carpet Python <i>Morelia spilota imbricata</i>	Schedule 4	Not listed	Occurs in south-west Western Australia, from Northampton, south to Albany and eastwards to Kalgoorlie, and including undisturbed remnant bushland near Perth and the Darling Ranges, Yanchep National Park, and Garden Island. This subspecies has been recorded from semi-arid coastal and inland habitats, Banksia woodland, eucalypt woodlands, and grasslands. The diet includes a variety of terrestrial vertebrates.	Sighted during the 1999 survey (included Gwindinup area)
Square-tailed kite <i>Lophoictinia isura</i>	Not listed	Not listed	The Square-tailed Kite ranges along coastal and subcoastal areas and can be found in a variety of timbered habitats including dry woodlands and open forests but shows a particular preference for timbered watercourses. It is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km <sup>2</sup> . Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs	Recorded in 1999 and 2007 surveys.
Western Freetail-bat <i>Falsistrellus mackenziei</i>	Not listed	Not listed	Western Freetail-bats have been found in a variety of habitats from tall forests to open woodland, mallee and coastal heathland, yet little is known about their natural history. Likely to shelter in tree hollows, and/or under bark, tree fissures and/or rock fissures and caves.	Not recorded during field surveys but potentially present as suitable habitat found on site.
Western Ring-tailed Possum <i>Pseudocheirus occidentalis</i>	Schedule 1	Vulnerable	WRPs are found in the coastal and near coastal area between Bunbury and Dunsborough and inland to the base of the Whicher Scarp. They rely heavily on peppermint <i>Agonis flexuosa</i> for food and roosting, and shelter/breed in large hollows in (typically) Eucalyptus trees.	Only one sighting in the 1999 surveys at Gwindinup area. None observed since.
Western Yellow Robin <i>Eopsaltria griseogularis</i>	Not listed	Not listed	Western Yellow Robins live in eucalypt woodland, mallee and acacia shrublands, and lay 2 eggs in a cupped nest. Breeding mostly takes place from July to January each year. During winter months, birds move from highland areas to lowlands. Feeds on insects, spiders and other arthropods.	Recorded in 1999 in the bluegum plantations at Gwindinup.
Wood Sandpiper <i>Tringa glareola</i>	Not listed	Marine; Migratory	Uncommon. Prefers freshwater. Breeds in Siberia and Manchuria	Not recorded and unlikely to occur within the project area.
Woylie* <i>Bettongia penicillata ogilbyi</i>	Schedule 1	Not listed	Habitat is open forest and woodland with a low understorey of tussock grasses or woody scrub. Woylies are nocturnal. Males and females occupy distinct individual home ranges that include a nesting and a feeding area.	Not recorded and unlikely to occur within the project area.

\* Fauna not identified in the desktop survey but reported by local landowner as potentially present