

APPENDIX 2: THREATENED SPECIES PROFILES

A2.1 Preliminary Information

A scale used by the author to indicate the likelihood of the species to potentially occur in the habitat on the study sites (if they have not been recorded in the locality) is as follows:

- *unlikely* (<1% probability) - no potentially suitable habitat; too disturbed; or habitat is very poor. No or few records in region or records/site very isolated eg by pastoral land, urbanisation, etc.
- *low* (1-10%) - few minor areas of potential habitat; highly modified site/habitat; or few habitat parameters present, but others absent or relatively insignificant (sub-optimum habitat). Usually very few records in locality.
- *fair* (11-25%) - some significant areas of potential habitat, but some habitat parameters limited. Potential for occasional foraging eg from nearby more optimal areas or known habitat. Records at least within 10-15km radius of site.
- *good* (26-50%) - significant abundance of habitat parameters/areas of habitat, and more locally eg adjacent. Potential part of larger territory, but probably unable to support breeding in isolation. Recorded within 10km in similar habitat/environs.
- *Moderate* (51-75%) - quite good potentially suitable habitat on and adjacent to the site, and/or good quality and abundance of some vital habitat parameters. Records within <10km, or adjacent to site, or adjacent to high quality habitat where species likely to occur.
- *high* (>75%) - very good to optimum habitat occurring on or adjacent to the site (support breeding pair or population). Recorded within 5-10km of site in same or similar habitat.

A.2.2 Ecological Profiles and Extent of Local Populations

EASTERN FREETAIL BAT (*Mormopterus norfolkensis*)
GREATER BROAD-NOSED BAT (*Scoteanax rueppellii*)
YELLOW-BELLIED SHEATHTAIL BAT (*Saccolaimus flaviventris*)
SOUTHERN MYOTIS (*Myotis macropus*)

ECOLOGICAL PROFILE:

(a) Eastern Freetail Bat:

Specific habitat requirements of the Eastern Freetail Bat (hereon abbreviated to EFB) are poorly known. It has been recorded in habitats ranging from rainforest to dry sclerophyll and woodland, with most recorded in the latter (Churchill 1998). It mainly roosts in small colonies in tree hollows and under loose bark; has been found under house eaves and metal caps on telegraph poles, and was recorded in 1998 roosting in a church roof at Hat Head.

It probably forages above forest or woodland canopy, and in clearings adjacent to forest (Smith *et al* 1995, Allison 1991, Churchill 1998). It has been recorded foraging on edge of pasture and forest remnants with little or no undergrowth at Valla (Berrigan 1998a, 1998b), and foraging on edge of recently underscrubbed “parkland” and denser dry sclerophyll forest at Arakoon (Berrigan 2000c). Most records are of single individuals, and is likely to occur at low densities over its range (Churchill 1998).

(b) Greater Broad-Nosed Bat

In NSW, this bat occurs in habitats generally below 500m altitude, ranging from woodland to moist and dry eucalypt forest, and rainforest, with a preference for moist gullies in mature coastal forest or rainforest on the eastern side of the Great Dividing Range (Churchill 1998, Smith *et al* 1995). It mostly roosts and nests in tree hollows in trunks and branches but will use old buildings. It generally forages at a height of 3-6m in rainforest but prefers the edges/ecotones between woodland,

cleared land and riparian forest ie along gullies, creeks and small rivers (NPWS 1994b, Hoye and Richards 1995, Richards 1991, Smith *et al* 1995). It requires a sparse understorey to forage on large insects (moths, beetles and chafers) and small vertebrates possibly including other bats.

This consultant has recorded this species foraging on the edge of recently underscrubbed dry sclerophyll forest at Arakoon (Berrigan 2000c) and on the edge of rural-residential land and forest near Harrington (Berrigan 2001f).

(c) Yellow-Bellied Sheath-tail Bat:

The ecology of this species is poorly known. Found in almost all habitats, particularly wet and dry sclerophyll forests and woodlands below 500m altitude, and also open woodland, Acacia shrubland, mallee, grasslands and desert. Roosts mainly in tree hollows, but also under bark, under roof eaves and in other artificial structures. Found also in abandoned Sugar Glider nests, and in northern parts of its range cracks in clay and animal burrows.

Fast flying species, believed to forage above the canopy or closer to the ground in open areas. Insectivorous - known to prey on grasshoppers, chafers and shield bugs.

Found in southern half of its range mainly January to June, with a patchy distribution. May migrate to occupy southern area during warmer months. Usually solitary, but found in groups of up to 10 (commonly 2-6) in late Winter to Spring, and may be territorial. Breeds twice early-late Summer (AMBS 1995a, Richards 1991, Smith *et al* 1995, Churchill 1998).

(d) Southern Myotis (formerly the Fishing Bat/Large-Footed Mouse-Eared Bat - *M. adversus*):

This highly social species (hereon referred to as SM) lives in colonies usually ranging from 10 to 15 but may occur in hundreds. Usually roosts in caves, mines and tunnels but also tree hollows, buildings, stormwater drains, bridges, and within dense foliage (i.e. *Pandanus*) in the tropical part of their range. Roosts are usually selected close to water. Riparian corridors are considered important.

Found in most habitat types near water eg mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River Red gum woodland. Key habitats are lagoons, lakes, streams, rivers and other water bodies and their banks. Prefers riparian habitat over 500m in length. Foraging is generally along or above streams and large still water bodies for small fish and aquatic insects, but also an aerial forager. Prey includes moths, beetles, crickets, cockroaches, flies and water insects (eg water-boatmen, mayflies and water-striders), and small fish. Seldom encountered more than a few hundred metres from their foraging habitat (Churchill 1998, Smith *et al* 1995).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

The property contained a number of hollow bearing trees in the forest remnants and the Pastoral Woodland which may be suitable as at least temporary roost sites for the GBNB, EFB, YBSB and the SM. However, there are no caves, cliffs or overhangs on or directly adjacent the property, which precludes species depending on such resources to breed or roost in, unless they are known to forage widely from such habitat components or utilise alternative roosts during non-breeding stages (eg the Bent-Wing Bats). Buildings on the property may offer temporary roost sites for the above species. It is possible that some hollows on the property may be structurally suitable for breeding roosts for some of these species however the limited abundance of this key habitat component suggests competition between and within species is likely to be high especially with common woodland birds in the Pastoral Woodland (observed to be dominated by birds).

Potential foraging habitat for the YBSB, EFB, CBWB, GBNB and the LBWB (which was detected on the site) existed on the margin between the forests and cleared grazing land, over the limited areas of continuous canopy, and in the open woodland where these species could forage for insects. The SM may potentially occur on the property opportunistically foraging over the dams (especially the large ones) and along Duchess Gully.

Given the ecology of the subject species and their mobility (given above), the local population of any of these species would extend well beyond the confines of the site and property.

JABIRU/BLACK-NECKED STORK (*Ephippiorhynchus asiaticus*)

ECOLOGICAL PROFILE:

The Jabiru inhabits riverine swamps, large permanent pools, coastal wetlands and estuaries, but also uses brackish or saline habitats, mangroves and artificial habitats such as farm dams and sewage ponds. It forages for small invertebrates, frogs, fish,

reptiles and small mammals. It may establish in a location for several years, but can travel widely to favourable habitats (Smith, 1995, DEC 2005a).

The Jabiru nests in large stick platforms in live or dead trees in secluded swamps often overhanging water (Lindsey 1992). In NSW, eggs are laid in August-November (DEC 2005a). Most breeding occurs in north Qld and the Northern Territory, and it occurs elsewhere as a vagrant during non-breeding season (July-February), it generally frequents the same areas. The Jabiru may occur singly, in pairs or small groups (up to 18 recorded) (Smith et al 1995). The NSW population in 1965 was estimated to be only 37-43 individuals.

Critical habitat components include the aquatic food base, water quality and roost and nest trees. Disturbance of feeding by livestock may be less critical than an adequate food supply (RAOU, quoted in Smith *et al* 1995).

HABITAT ON SITE AND EXTENT OF LOCAL POPULATION:

This species was not recorded on the property by this or previous surveys but has been recorded in the locality at several locations including a breeding record in the northeast of Queens Lake (Mr Andy Marshall NPWS pers. comm.). Potential habitat is considered to constitute the two small dams and to a lesser extent the two large dams (limited by the steep sides). In wetter years, perhaps some sections of the pasture may be used for opportunistic foraging.

Overall the property offers potential habitat which may be used as part of the Jabiru's non-breeding range over the LGA depending on seasonal conditions. The property is not considered to have sufficient habitat or reliability of food resources to support breeding, as well as being prone to a high human presence which could lead to disturbance of breeding. Hence it is considered a low to fair potential occurrence on the property.

GLOSSY BLACK COCKATOO (*Calyptorhynchus lathamii*)

ECOLOGICAL PROFILE:

The Glossy Black Cockatoo (hereon referred to as GBC) typically occurs in dry to moist sclerophyll forest (often on low nutrient soils) containing its preferred forage species – it has a restricted diet of large-coned Casuarina and Allocasuarina (*A. littoralis* and *A. torulosa* are the preferred coastal species) (NPWS 2005). Food trees generally have large cone crops (eg >200 cones) and young cones (easier to open and the seeds have higher protein content). Cones are not selected on size but on number of seeds per cone (to maximise foraging effort efficiency), thus a tree with a large crop is not necessarily a preferred food tree (Clout 1989). Trees may require at least 10 years of growth before being potentially utilised (Mt King Ecological Surveys 1993b) though small trees under 3m tall may be used (personal observations).

This species lives in loose groups (pairs disassociate for breeding and return with young to group) ranging from 2-20 individuals, occupying a permanent area (range over 100km), following the fruiting pattern of its preferred food tree species (some pairs have been recorded searching over 40km for suitable food trees).

An Autumn to Winter breeder, perhaps linked to the phenology of its food, it requires nesting hollows, around the mid canopy, in dead limbs or trunks approximately 18cm in diameter with very wide bottoms, usually in dead trees (Smith *et al* 1995, Schodde and Tideman 1990, NPWS 1999), and often amongst the largest trees in a relative stand (Gibbons and Lindenmayer 2002). Bird numbers may possibly be limited by nest site availability (Mt King Ecological Surveys 1993b). European honeybees have been recorded killing nestlings, and may render hollows unusable (Garnett *et al* 1999, Gibbons and Lindenmayer 2002), while other species which have extended their range eg Galahs, may compete for nest sites (Garnett *et al* 1999, Gibbons and Lindenmayer 2002).

Preference for tracts of undisturbed or minimally disturbed woodland (State Forests 1995). Coastal groups generally smaller than inland groups (Smith *et al* 1995).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

Potential habitat for this species essentially consists of a small stand of Black Oaks along part of the western boundary adjacent to Ocean Drive within a stand of mixed forest mapped as Dry Sclerophyll/Swamp Forest. Some trees also occur in the DSF D in the southeast. No evidence of feeding was found on the property and no birds were observed despite numerous local records (eg Darkheart 2006h, 2004q, DECC 2009a, Bionet 2009)

A few hollows in Forest Red Gums in pastoral woodland on the property had some marginal structural potential to provide nest sites for this species, though trunk diameter of host trees suggested internal dimensions may not be sufficient. Current use of

hollows by common woodland birds including Galahs further indicated the very low potential for these hollows to be selected by the GBC.

Overall, the property is considered to offer only a relatively minute area of potential foraging habitat forming a marginal part of the local population's local range which would at least include large areas of known habitat in nearby Queens Lake State Forest/State Conservation Area (Darkheart 2006h, DECC 2009a, Bionet 2009) and large area of private land (eg Darkheart 2004q).

SWIFT PARROT (*Lathumus discolor*)

ECOLOGICAL PROFILE:

From the Preliminary Determination (NSWSC 2009):

“2. The distribution of the Little Lorikeet extends from just north of Cairns, around the east coast of Australia, to Adelaide. In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri (Barrett *et al.* 2003).

3. There is no evidence of regular migration, but Little Lorikeets are generally considered to be nomadic (Higgins 1999), with irregular large or small influxes of individuals occurring at any time of year, apparently related to food availability. However, long term investigation of the breeding population on the north-western slopes indicates, that breeding birds are resident from April to December, and even during their non-resident period, they may return to the nest area for short periods if there is some tree-flowering in the vicinity (Courtney & Debus 2006).

4. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. In south-east Queensland (Smyth *et al.* 2002), Little Lorikeets were more likely to occupy forest sites with relatively short to intermediate logging rotations (15–23 years) and sites that have had short intervals (2.5–4 years) between fires.

5. Little Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes. On the western slopes and tablelands White Box *Eucalyptus albens* and Yellow Box *E. meliodora* are particularly important food sources for pollen and nectar respectively (Courtney & Debus 2006). They are also reported as feeding on fruits, particularly those of mistletoes (Higgins 1999).

6. The breeding biology of Little Lorikeets is little known, except for long-term observations (43 years) on the north-western slopes by Courtney and Debus (2006). This work, consistent with anecdotal records from around the country, indicates that nest hollows are located at heights of between 2 m and 15 m, mostly in living, smooth-barked eucalypts, especially Manna Gum *Eucalyptus viminalis*, Blakely's Red Gum *E. blakelyi* and Tumbledown Gum *E. dealbata*. Hollow openings are very small, approximately 3 cm in diameter, and are kept open by the activities of the occupants, which use their beaks to bite away living bark from around the opening. When nest hollows are deserted, e.g. after storm-damage to trees, hollows can close over within 14 months (Courtney & Debus 2006). Nest hollows are occasionally located in dead trees, but birds generally desert hollows within two years of tree death. Nest-hollows are used 'traditionally', with the same hollow known to be occupied for at least 29 years (not necessarily by the same individuals) (Courtney & Debus 2006). The breeding season extends from May to September (Higgins 1999) and as long as eucalypt nectar and pollen are available throughout this period, two broods of fledglings can be raised in a season. Clutches are of three to five eggs (Higgins 1999) and broods of three and four young have been recorded, with a single fledgling recorded from one nest (Courtney & Debus 2006). No data are available on generation time in wild birds and the 'low-reliability' estimate of two years (Garnett and Crowley 1998), for the ecologically-similar Swift Parrot *Lathamus discolor* would seem a poor surrogate, given that other lorikeet species are known to survive and potentially breed for 20 years (Rainbow Lorikeet *Trichoglossus haematodus*: ABBBS 2008). Little Lorikeets in captivity are known to breed at one year of age (G Phipps, pers. comm. 2008, R Webb, pers. comm. 2008) and this suggests a minimum age for maturation in the wild of one year. A life span of 10 years in the wild is a reasonable estimate for a parrot of this size (W Boles, pers. comm. 2008). An approximation of generation time based on the age of maturity plus half of the length of the reproductive period of the life cycle (IUCN 2006) produces an estimate of generation time of approximately five years.”

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

This bird has been recorded in the locality. The site offers limited potential foraging habitat due to the extent of pastoralism. The Blackbutt forest along Duchess Gully, paperbarks and Swamp Mahogany regrowth, small patches of mixed dry sclerophyll on the property, and the scattered Forest Red Gums are potential forage habitat, but are subject to competition with the local abundance of common Lorikeets and other birds eg Noisy Miner. Suitable potential hollows occur on site, especially in the pastoral woodland, but these appear dominated by the common Lorikeets, hence nesting potential is limited. However, may occur on site as transient forager during peak flowering periods, as part of local range. Hence the local population would extend well beyond the site.

SWIFT PARROT (*Lathumus discolour*)

ECOLOGICAL PROFILE:

This bird lives in eucalypt forests and woodlands, particularly box-ironbark, and feeds primarily on mostly on pollen and nectar of Winter flowering eucalypts, but also feeds on fruit, seeds, lerps and insect larvae (Schode and Tideman 1990, Brereton 1996, Garnett and Crowley 2000). Preferred sites have high soil fertility and large trees with large nectar production; often along drainage lines, or in isolated or small rural or urban remnants (Emison *et al* 1987, Tzaros 1996 and 1997. Favoured species are *E. robusta*, *Corymbia gummifera*, *E. globulus*, *E. sideroxylon*, *E. leucoxylon*, *E. labens*, *E. ovata*, *C. maculata*, *Banksia serrata* and *B. integrifolia*

This species only breeds in Tasmania (mostly along the southeastern coast, within 8km of the coastline). Nesting occurs in hollow bearing trees usually away from foraging sites.

Post-breeding (from about January), the species disperses throughout Tasmania and the mainland (Autumn onwards) from southeast South Australia (to the Adelaide Plains), along the coast and inland slopes of the Great Dividing Range, up to southeast Queensland (Duaringa and Chinchilla). Non-breeding birds are highly mobile, with movements varying between years (some sites are used repeatedly). Mainland sites usage varies year to year, probably also due to nectar availability (Wilson and Bennet 1999). Migrants return in Spring, forming flocks (Brereton 1996). The species is usually found on the mainland from March to September (Smith *et al* 1995).

The Swift Parrot is predicted to occur over 860 000km² (medium confidence), with only about 4000km² occupied and decreasing (low confidence). There are estimated to be about 1300-2000 breeding pairs: decreasing (Birds Australia 2002, Garnett and Crowley 2000).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

The DECC (2009a) Atlas of Wildlife has a record of this species possibly (exact location depends on the precision of the data) in the northern end of the property for 2005. Habitat on the site consists of Forest Red Gum scattered over the pastoral woodland. This extends outside the site onto the property, with other potential habitat available via Swamp Mahogany in the swamp forest. White Banksia on other parts of the property may also offer potential habitat. Overall, these resources offer a relatively minute area of potential foraging habitat (depending on flowering incidence) for this widely nomadic species as part of its non-breeding range. Locally, more abundant habitat occurs to the west in nearby Queens Lake State Forest/State Conservation Area (Darkheart 2006h), Lake Innes Nature Reserve (NPWS 1994a) and large area of private land (eg Darkheart 2004q). Occurrence on the property thus would be as opportunistic foraging forays of a few individuals as part of its seasonal nomadic movements, with occurrence on the property subject to competition and aggressive encounters with common woodland birds such as Scaley Breasted Lorikeets and the Noisy Miner which were also present.

POWERFUL OWL (*Ninox strenua*) BARKING OWL (*N. connivens*) MASKED OWL (*Tyto novaehollandiae*)

ECOLOGICAL PROFILE:

(a) Powerful Owl:

Australian population is possibly about 7000 breeding birds (stable) classed as Least Concern under The Action Plan for Australian Birds (Garnett and Crowley 2000). The Powerful Owl attains its greatest relative abundance in northeastern NSW (Kavanagh 2000b).

The Powerful Owl (hereon abbreviated to PO) inhabits open *Eucalypt*, *Casuarina* or *Callitris* pine forest and woodland, and may forage along the forest's edge, although it may prefer gullies in coastal forests (below 1500m ASL), but is generally found where prey densities and roost densities are sufficiently high. It has also been recorded breeding and foraging successfully within forests and woodlands within metropolitan areas of large cities provided suitable prey species and nesting cavities are available, however, is sensitive to disturbance of nests and thus has lower breeding success (Cooke *et al* 2000). Hence overall, it is regarded as a habitat generalist (Kavanagh 2000b).

The PO preys opportunistically on large arboreal mammals such as the Yellow-Bellied Glider, Sugar/Squirrel Gliders, Common-Ringtail Possum, Greater Glider (high populations of the latter species is often linked with the occurrence of the PO) and even smaller Koalas, supplemented with terrestrial mammals (eg rats, bandicoots and juvenile wallabies), birds (eg galahs, currawongs, rosellas, lorikeets, cockatoos), fruit bats (especially if camps are nearby) and even insects (eg Christmas Beetles and large Ghost Moths), depending on abundance of prey (eg other species may be taken where mammals populations are low, though this is seen as less sustainable) (Debus *et al* 1994, Soderquist *et al* 2000, Kavanagh 2000a). Birds tend to be taken in more fragmented habitats where density and abundance of arboreal prey is lower (Kavanagh 2000a). The PO requires the equivalent of a small possum every two nights to maintain physiological demands (Garnett 1993, Schodde and Tideman 1990). Hunting may be concentrated in part of the territory for some time, resulting in local declines in abundance and diversity (Kavanagh 1988), but also sees the entire home range being used regularly (Soderquist *et al* 2000).

The PO is sedentary, and solitary or in pairs occupying permanent territories of 300-5000ha (average 800-1000ha), depending on the quality of habitat (Debus 1995, Soderquist *et al* 2000, Kavanagh 2000b). Favoured roosts are on a branch within dense foliage of a tall understorey or sub-storey tree in moist, tall forest, rainforest or open forest. Recorded roost species include Forest Oak (*Allocasuarina torulosa*), Lilly Pilly (*Acmena smithii*), *Leptospermum* spp, *Acacia* spp. and Turpentine (*Syncarpia glomulifera*). The PO has also been recorded roosting in pine plantations near eucalypt forest.

Nests are usually located in large (30 to >150cm DBH, average 77-180cm DBH; with minimum 10cm wide apertures), deep (1-3m) hollows in trunks of trees, or horizontal and sloping spouts, 9-37m above ground (Debus 1995, Kavanagh 1997). These trees are often the largest and oldest tree (150-500 years) within a forest patch (eg an emergent), and are generally located at the head of a minor drainage line or upslope of streams (Soderquist *et al* 2000, Smith *et al* 1995, Gibbons and Lindenmayer 2002).

Breeding mainly occurs in Winter (Kavanagh 2000a), and nest fidelity is usually high, though some pairs have been recorded selecting new sites on average every two years (Kavanagh 2000b). Two eggs are laid per year, with most pairs able to raise at least one young (Kavanagh 2000b). Siblicide is not unknown.

(b) Barking Owl:

The Barking Owl (hereon abbreviated to BO) shows a preference for more open country ie savannah woodland, woodland, as well as forest. It is widespread on the foothills and coastal plain, to the inland slopes and plains, and rare or absent in dense, wet forests on the eastern fall of the Great Dividing Range. It has been recorded roosting in rainforest, but prefers to forage in more open country including farmland. Its preferred habitat is usually dominated by eucalypts and paperbarks (NPWS 2003b), and has even been recorded in remnants of forests and woodland, and in tree copses on farmland, in towns and golf courses. Roosts are normally in dense foliage of large trees (including rainforest species) such as streamside gallery forests, River She-Oak, Casuarinas, Allocasuarinas, eucalypts, Angophoras and Acacias. Roosts are not necessarily hidden (NPWS 2003d).

Nesting occurs in hollow trees, mainly eucalypts or paperbarks, usually near watercourses or wetlands. Nest is a large open hollow often vertical or sloping in a trunk or spout of a live or dead tree, 2-35m above ground, with an opening of 20-46cm and depth of 20-300cm. Breeding is in permanent territories, and is strictly seasonal with eggs laid in late Winter or Spring (August-October in NSW). Fledglings are seen with their parents about October to January, and disperse at the end of Summer (NPWS 2003d).

Population densities are not well known for the species, though some studies have recorded breeding pairs spaced <1-10km apart. Large territories (probably at least 200ha, but more likely up to 6000ha) are maintained with territorial calls at dusk and dawn.

Least nocturnal of Australian owls, hunting before dusk for small to medium prey such as birds, large insects and mammals. Tends to eat more birds than other forest owls and takes rosellas, starlings and magpies, with a concentration on mammals during breeding and Winter; and often a lot more insects post-breeding in warmer months. Common prey include rabbits,

hares, smaller marsupials, possums, Sugar Gliders, Squirrel Gliders, Brushtailed Phascogale, rats mice, and a variety of birds (NPWS 2003d).

(c) The Masked Owl:

Southern Australia subspecies estimated to number about 7000 breeding birds (stable), and is classed as Near Threatened under *The Action Plan for Australian Birds* (Garnett and Crowley 2000). The Masked Owl attains its greatest relative abundance in northeastern NSW (Kavanagh 2000b).

The Masked Owl (hereon abbreviated to MO) prefers eucalypt forest and woodland with a sparse understorey, and appears to require partial clearing/open areas or forest edges for foraging, hence it is regarded as habitat generalist (Kavanagh 2000b). They also inhabit more open areas eg farmland. It appears to avoid wetter and denser forest (Kavanagh 2000a) and is least common in forested environments with a denser understorey and/or dense groundcover, including early stages of forest regrowth (Kavanagh 2000b).

The MO is solitary, and sedentary, occupying a large permanent territory about 500-1000ha/5-10km² (average 800-1200ha) (Debus 1995, Kavanagh 2000b). It preys closer to the ground than the other owls, and appears to be more of a specialised predator on small terrestrial, scansorial (climbing) and arboreal mammals in the 200-600g range (eg rats, antechinuses, Sugar Gliders, Common Ringtails, bandicoots and rabbits), birds (eg Tawny Frogmouth Owl), domestic poultry and even insects (Garnett 1993, Schodde and Tideman 1990, Debus 1995, Mt King 1993, Kavanagh 2000). The Masked Owl appears to predate more on introduced species in highly disturbed environments, and native species in more natural habitats (Kavanagh 2000).

The MO roosts in tree hollows in eucalypts, and also in Lilly Pilly's and some rainforest trees, dense foliage (infrequent), caves and crevices. Nests are located in tree hollows or cliffs. Tree hollow nests are generally in vertical trunk or spout hollows 10-30m high, 0.5-5m deep and 0.5m wide, in or near eucalypt forest or woodland (Debus 1995). Selected trees are usually 100-191cm DBH (Kavanagh 1997).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

Overall, the general property with its mix of habitats from pasture to forest is considered to offer limited potential for foraging and temporary roosting of these birds which have all been recorded in agricultural woodlands and similar habitats to that on the property and in the general area (DEC 2008b, Smith *et al* 1995, Debus 1995, NPWS 2003d, Garnett 1993, Schodde and Tideman 1990, Debus 1995, Mt King 1993, Kavanagh 2000a, 2000b, Cooke *et al* 2000). Prey diversity and abundance is limited due to the constraints of the property (eg majority it pasture and retained forest is fragmented, isolated and mostly regrowth). Given the species' large home range and dietary requirements, as well as extent of forest to the west and further north and south, the property at most may only lie on the marginal fringe of the large territory of a pair of these species. Both the MO and PO have been recorded within 1km of the property (Darkheart 2004q, Mrs Penny Marshall BHPA pers. comm., DECC 2009a, Bionet 2009), hence these species in particular have some low to marginally fair potential to occur on the property using it for opportunistic foraging forays.

The property is not considered to offer any suitable nest sites as while some tree hollows may have suitable opening apertures, internal dimensions suggested by trunk diameter is considered likely to be insufficient.

Given the territory size of these species, low quality habitat on the property and their ecology, the local population would extend well beyond the confines of the property.

OSPREY (*Pandion haliaetus*)

ECOLOGICAL PROFILE:

The Osprey is coastally distributed, occurring singly or in dispersed pairs in territories along the coastline with active nests usually more than 1km apart. It feeds almost exclusively on fish, commonly Mullet or Bream in relatively clear water. Optimal habitat is shallow water with sufficient fish of 25-35cm length and nearby structures suitable for vantage points, feeding platforms and nest sites (Clancy 1991, DEC 2005a).

Ospreys rarely feed on the ground and utilise feeding perches near feeding grounds and also near the nest. Tall dead trees may also be used as vantage points (Clancy 1991). Nests are located in tall usually dead trees, but occasionally live trees, artificial structures, rock ledges, cliff faces, rocky foreshores and islands within 1-2km of water, but rarely adjacent. Preferred tree locations are exposed positions (to prevailing winds which reduce thermal loads) with easy access and good visibility.

Preferred stick sources are *Melaleuca quinquenervia* and *Casuarina glauca*, and a sufficient presence of such material in adjacent swamp forest or other stands of vegetation may be a limiting factor in nest site selection. Breeding extends from March to November and may be linked to the migration of Sea Mullet which enter NSW in May-June. Eggs incubate in 35 days and young fledge at 9 weeks. Nests are used in successive years. Nests are actively defended from other raptors and potential nest raiders eg Crows and Kookaburras. Also locally nomadic and capable of travelling long distances to access suitable feeding and nesting grounds (Clancy 1991, DEC 2005a, Smith *et al* 1995).

In the Port Macquarie NPWS district (which includes Hat Head National Park), some 47 nest sites and minimum of 86 birds are known to exist (NPWS pers. comm. 1999).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

Potential habitat on the property consists of the two large dams and Duchess Gully. All of these habitats contain potential prey species of this raptor, but given its ecological requirements, extent of habitat on the property relative to the locality, would only form a minute portion of the territory of one pair of birds.

No nests occurs on the property though Forest Red Gums in the pastoral woodland offer some structural potential. Nesting is considered a very low potential probability given presence of a Whistling Kite nest in this area.

LITTLE EAGLE (*Hieraaetus morphnoides*)

ECOLOGICAL PROFILE:

From the Preliminary Determination (NSWSC 2009):

“2. The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (Marchant and Higgins 1993; Aumann 2001a). For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. Young fledge in early summer. It eats birds, reptiles and mammals, occasionally adding large insects and carrion (Marchant and Higgins 1993; Aumann 2001b; Debus *et al.* 2007). It was formerly heavily dependent on rabbits, but following the spread of rabbit calicivirus disease, and consequent decline in rabbit numbers by 65-85% in the arid and semi-arid zones (Sharp *et al.* 2002), the eagle is increasingly dependent on native prey. Most of its former native mammalian prey species in inland NSW are extinct (terrestrial mammals of rabbit size or smaller, *e.g.* large rodents, bandicoots, bettongs, juvenile hare-wallabies and nailtail wallabies: Van Dyck and Strahan 2008).

3. The Little Eagle is distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment (Marchant and Higgins 1993). It occurs as a single population throughout NSW. The population in New Guinea is now classified as a separate species, the Papuan Booted Eagle *Hieraaetus weiskei* (Lerner and Mindell 2005).”

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

This bird has been recorded in the locality. Given the ecology of the species, the property would only form a fraction of the home range of the local pair. Potential prey on site would constitute rodents, bandicoots, dasyurids, grasshoppers, woodland birds and reptiles. As most of the property is open pasture, foraging is likely to be mainly around the limited remnants. Competition with the resident Whistling Kite may deter presence of this species.

SQUARE-TAILED KITE (*Lophoictinia isura*)

ECOLOGICAL PROFILE:

The Square-Tailed Kite (hereon referred to as STK) has an Australian population size of approximately 7000 breeding pairs (low reliability) and stable (low reliability), and it is classed as Least Concern in The Action Plan for Australian Birds (Garnett and Crowley 2000).

It typically inhabits coastal forested and wooded areas primarily within 250km of coast and rarely inland along wooded watercourses and in central Australia (Blakers *et al* 1984, Debus and Czechura 1989). Often associated with ridge and gully forests, STK usually prefers open eucalypt forest and woodland and will forage in open country or partially cleared pastoral

country. It is never abundant anywhere, occurring as solitary birds or dispersed pairs. The STK has a marked preference for continuous stands of open forest/woodland. It may forage over mallee, heath and shrubs, and in wooded urban areas particularly if passerine birds present.

The STK is a specialist hunter of passerine birds, especially honeyeaters and nestlings, but also takes eggs, reptiles, rabbits and insects. It prefers to take prey from the outer foliage of the canopy; hunting in the morning and afternoon. The home range of a pair is reportedly at least 100km² with ranges up to 1700km² being reported (AMBS 1996, Garnett 1993, State Forests 1995, NPWS 2000).

Nests are constructed in mature, living trees in the fork or large horizontal limb of a tall eucalypt or angophora within forest, often near water. Breeding occurs in July to February (Debus and Czechura 1989). In southeast and southwest Australia, there is a recorded seasonal dispersal of this species north in the Winter and south in the Summer. This is more pronounced in the southwest (State Forests 1995).

In recent years, breeding has been recorded in Kempsey-Wauchope Forestry Management Area and at Port Macquarie, where it is also known to tolerate human activity, even when nesting (Bischoff *et al* 2000). The STK may be adapting to well-vegetated outer fringes of cities in northern NSW, feeding on the plentiful introduced and native passerine birds there (Debus 1998).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

A single bird has been observed foraging by this consultant over the southern end of the property in recent years. Given the ecology of the species, the property would only form a fraction of the home range of the local pair which may be based (as suggested by the nesting record) in Port Macquarie. As most of the property is open pasture, foraging is generally limited to the remnants of forest which were not noted to be particularly abundant with prey species, though seasonal abundance would vary.

WOMPPOO FRUIT-DOVE (*Ptilinopus magnificus*)

ECOLOGICAL PROFILE:

Recorded from large, undisturbed tracts of sub-tropical rainforest, dry rainforest, littoral rainforest, warm temperate rainforest and wet sclerophyll forests with a rainforest mid-storey. Occasionally in monsoon forest, tall open forest, open woodlands and vine thickets near rainforest (Marchant and Higgins 1993). This species demonstrates a preference for undisturbed or less disturbed moist forest and rainforest (Lindsey 1992). The Wompoo Fruit Dove is essentially restricted to central and northeastern NSW (Recher *et al* 1995).

Feeds almost entirely on fruit, foraging primarily high in canopy. Relatively sedentary to locally nomadic with dispersal over a local area according to fruiting pattern of preferred species (figs, native tamarind, myrtles, laurels, lily pillys, Bangalow Palm, White Cedar, *Smilax australis*, oliveberry and pigeonberry trees). Favoured species include: *Ficus macrophylla*, *F. fraseri*, *F. rubiginosa*, *F. watkinsiana*, Wild Tobacco (*Solanum maritimum*), *Acronychia oblongifolia*, *Neolitsea dealbata* and *Cissus antarctica* (Recher *et al* 1995).

Breeding habitat is dense rainforest, with timing according to fruiting patterns (generally July-September). Nest a flimsy platform of vine tendrils located on slender horizontal branches in the dense rainforest canopy, generally below 10m and as low as 2m above ground.

The NSW population probably exceeds 7000 birds (Recher *et al* 1995). The extent of the local population would be those individuals who use the locality as a seasonal forage resource.

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

This bird was observed by chance in 2003 as a small group flying along the dune vegetation to littoral rainforest near Middle Head, and as a single bird roosting opportunistically in the western dry sclerophyll. The property has no rainforest or littoral rainforest, with only a small area of mixed wet sclerophyll regrowth along the upper limits of Duchess Gully. This area is not considered likely to attract this bird to forage due to its limited extent and high exposure to predators. This and the ecology of the species readily indicates the property has no substantial value to the species and the local population extends well beyond its confines.

SQUIRREL GLIDER (*Petaurus norfolcensis*)

ECOLOGICAL PROFILE:

Inhabits dry sclerophyll forest and woodland (Suckling 1992, Lindenmayer 2002) though it has been recorded in areas bordering wet forest and rainforest (Lindenmayer 2002, Smith *et al* 1995). In NSW, the species has been recorded in a range of communities eg Blackbutt, Forest Red Gum and Red Bloodwood, Coastal Banksia heathland and Grey Gum/Spotted Gum/Grey Ironbark on central coast. On the mid-north coast, it has been recorded in Blackbutt-dominated coastal forest (AMBS 1996, Davey 1984, Quinn 1993); Needlebark-Blackbutt forest, Broad-Leaved Paperbark/Swamp Mahogany/Needlebark woodland (Bray, pers. comm. 1999); Scribbly Gum-Blackbutt dry sclerophyll (Berrigan 2002c, 2000d, 2000e, 2000f, Darkheart 2004c); in open dry sclerophyll forest dominated by *E. siderophloia* with *E. propinqua* and *E. acmenoides* near dry rainforest at Gowings Hill (Berrigan 2003a); dry sclerophyll dominated by White Mahogany associated with Grey Ironbark and Pink Bloodwood (Berrigan 1999a, Darkheart 2004a), though the latter may be an artificial population established by rehabilitated releases. In areas west of the Dividing Range, Squirrel Gliders have been recorded in long linear road reserves, surrounded by cleared agricultural land (Gibbons and Lindenmayer 2002).

Arboreal and hollow-dwelling, this species feeds on eucalypt sap, nectar, pollen, Acacia gum, honeydew, insect exudates, and arthropods (particularly Coleoptera and Lepidoptera larvae), but has also been recorded killing and eating nesting and roosting birds and their eggs (Lindenmayer 2002). Prefers smooth-bark gums due to higher invertebrate diversity and propensity to develop hollows. Areas containing Winter flowering flora, eg eucalypts, Banksia (eg *B. integrifolia* and *B. serrata*), and gum-producing Acacia species are considered by some as likely to be key habitat (Menkhorst *et al* 1988, Quin 1993, Quinn 1995). Xanthorrhoea may also be used for nectar.

Hollows occur in live and dead trees, with the entrance size generally preferred to be just big enough to allow the animal and exclude predators (eg Laced Monitor) and competitors (eg Brushtailed Possum) (Gibbons and Lindenmayer 2002). Hollow-bearing trees occur in forest to woodland, though isolated trees have been known to be used (Gibbons and Lindenmayer 2002, Law *et al* 2000). Like the Sugar Glider, the Squirrel Glider is also a den-swapping species (utilising a number of hollows, not just one, within its home range), due to lifecycle stages, predation, parasite build-up and season (and hence varying insulative properties of hollows) (Lindenmayer 2002, Gibbons and Lindenmayer 2002). The Sugar Glider uses up to 5 hollows in its range, and by inference (Gibbons and Lindenmayer 2002), the Squirrel Glider is likely to use a comparative figure.

The Squirrel Glider has been studied in Limeburners Creek Nature Reserve living in small groups (generally 1 male, at least 2 females plus juveniles) on home ranges of 2-4ha (densities approximately 0.9-1.5 individuals/hectare), which overlap with other groups to form a local population, which also overlaps with Sugar Gliders (Quin 1993). Lindenmayer (2002) provides a range of 3-5ha with a population density of 0.01-0.2/ha. Gilmore and Parnaby (1994) report a home range of 20-30ha in southern areas. A general range of 0.65-8.55ha is generally accepted (Quinn 1995) though home range is likely to be determined by habitat quality, although males move further than females.

Breeding occurs year round depending on food availability (up to two litters p.a.), with high mortality within the first 12 months (Suckling 1992). Juveniles remain in natal range for at least a year, with juvenile males experiencing aggression from dominant males (Quinn 1995). The Squirrel Glider lives in small family groups/colonies of up to 9 individuals, with a polygynous mating system, with males utilising opportunities to mate outside their colonies (depending on factors such as seasonal food availability, habitat distribution, etc) (Lindenmayer (2002).

Squirrel Gliders also often show dominance hierarchies, determined by aggressive interactions (Lindenmayer 2002). Studies have also shown the Squirrel Glider competes successfully for critical resources such as tree hollows with their closely related cousins, the Sugar Gliders (Lindenmayer 2002).

The Squirrel Glider is a gliding mammal, with distances of up to 50m recorded. The closely related Sugar Glider has also been detected running along the ground in habitats where tree distance prevented tree-to-tree glides (Lindenmayer 2002), though this is not considered a preferred method of movement due to predatory risk. Significant predators include foxes, cats, Laced Monitors, large forest owls and the Spotted-Tail Quoll (Lindenmayer 2002).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

This species was not recorded on the property despite suitable habitat in the southeast dry sclerophyll particularly. This species has been recorded to the southeast in the adjacent STP grounds (Biolink 2003) and thus is considered likely to use the southeast dry sclerophyll for foraging and denning in tree hollows as part of a wider home range of a local colony. Its use of habitat on the remainder of the property is considered significantly unlikely given fragmentation and isolation of other potentially suitable habitat (eg Paperbark/Swamp Mahogany swamp forest in the centre) and the poor condition of such habitat (eg lack of understorey or range of foraging resources). Given this, the southeast dry sclerophyll and adjacent Paperbark/Swamp Mahogany swamp forest is considered the only area likely to be used as part of a colony's wider range

which obviously extends beyond the property. This species has also been recorded in tentatively connected habitat in northeast Bonny Hills (Darkheart 2005a, 2005b) and these colonies are considered likely to exchange genetic information with the colony which may facilitate the southeast dry sclerophyll and swamp forest from the STP.

BLUE BILLED DUCK (*Oxyura australis*)

ECOLOGICAL PROFILE:

The Blue-Billed Duck (BBD) breeds in the Murray-Darling Basin, with non-breeding occurrences (mainly immature birds) using large, deep, open freshwater dams, rivers and lakes throughout the Basin and on the coast (NPWS 1999, DEC 2006b, Marchant and Higgins 1990, Smith *et al* 1995). It has also been recorded in sewage treatment ponds and also estuarine waterbodies during non-breeding seasons, and will readily use newly flooded areas (NPWS 1999, Marchant and Higgins 1990). It prefers clear, still, deep, well-vegetated (eg *Typhus* spp) freshwater wetlands with firmer substrates where it feeds on aquatic insects as well as various invertebrates, seeds, bulbs, stems and leaves (NPWS 1999, Marchant and Higgins 1990, DEC 2006b, Smith *et al* 1995).

HABITAT ON PROPERTY/SITE AND EXTENT OF LOCAL POPULATION:

This rarely recorded bird is considered a low potential occurrence in the large dams on the property which offer a large area of deep water though with limited vegetation. Given a record of this species in the Port Macquarie STP and the size of the dams on the property, there is a small chance a few birds could opportunistically use this habitat as part of their non-breeding range. A subsequently detailed in part (a), the creation of a 10.72ha wetland may increase the potential for this seasonally nomadic bird to occur in the area.

BLACK BITTERN (*Ixobrychus flavicollis*) AUSTRALASIAN BITTERN (*Botaurus poiciloptilus*)

ECOLOGICAL PROFILE:

(a) Black Bittern:

Australia-wide, estimated to be about 20 000 breeding birds (decreasing), within 3 sub-populations, with the largest about 19 500. Classed as Least Concern under The Action Plan for Australian Birds (Garnett and Crowley 2000).

This solitary, seldom seen and characteristically shy bird inhabits terrestrial, fresh and estuarine wetlands, usually with permanent water and dense vegetation, and estuaries, watercourses, billabongs and pools. Other general habitats with permanent water (eg rivers and creeks) such as rainforest, swamp forests, riparian strips, woodland, mangroves and flooded grassland may also be used (Marchant and Higgins 1990).

The bird forages on reptiles, fish, frogs/tadpoles and invertebrates including molluscs, crustaceans and insects (including aquatic larvae). Birds often rest in denser waterside vegetation (eg trees or reeds) during the day, and forage at night, dusk or during the day, (Marchant and Higgins 1990, Readers Digest 1990).

The bird can be either nomadic or sedentary depending on the quality of habitat and seasonal conditions (eg drought) (Ecotone Ecological Consultants 1998).

Breeding is presumed to be from December to March, when birds pair up. Nests constructed of twigs may be located on a tree branch overhanging water, or on reeds (Marchant and Higgins 1990, Readers Digest 1990, personal observations).

(b) Australasian Bittern:

Australia-wide, estimated to be about 2500 breeding birds (low reliability estimate; trend is decreasing), within 3 sub-populations, with the largest about 1000. Classed as Vulnerable under The Action Plan for Australian Birds (Garnett and Crowley 2000).

The Australasian Bittern is also cryptic and seldom seen. It has narrower habitat preferences than the Black Bittern, being mainly found in shallow, vegetated freshwater or brackish swamps. Occurrences and hence detectability increases in wetter seasons where more ephemeral habitats and peak breeding may occur (Garnett and Crowley 2000, Readers Digest 1990).

This bird is solitary, generally hunting at night by wading up to knee deep in water or the waters edge. Prey includes amphibians, fish, crustaceans, snails, small terrestrial mammals (eg mice) and various insects (Garnett and Crowley 2000, Readers Digest 1990). Pairs occupy territories, though each bird may have its own foraging territory, throughout which it will build roosting pads under brakes of reeds (Garnett and Crowley 2000, Readers Digest 1990). The latter may be identified by pellets of indigestible material (Readers Digest 1990).

Breeding occurs from October-January. Breeding males vocalise with a booming call. Nest may be either a trampled mat of reeds and rushes (Readers Digest 1990), a well-constructed cup (Garnett and Crowley 2000) usually over water in dense cover (Readers Digest 1990), or a branch overhanging water (personal observations). Females incubate and hatch the young unaided, and there is some suggestion of polygyny (Readers Digest 1990).

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

Potential habitat for these species on the property is considered to constitute the estuarine sections of Duchess Gully, most of which occurs downstream. The large dams are considered marginal due to limited cover and roosting potential but could be used for foraging forays as part of their wider range. Given the limited habitat on the property and ecological requirements of the species, the local population of these species would extend well beyond the property.

EASTERN BLOSSOM BAT (*Syconycteris australis*)

ECOLOGICAL PROFILE:

The Eastern Blossom Bat (hereon referred to as EBB) is a small solitary bat that is an ecological specialist. Important habitat components for the EBB are suitable roosts in rainforest or swamp forest and nearby foraging resources in heath or swamp forest (Law 1993).

It appears to be dependent on a continuous supply of nectar and pollen (Law 1993, Smith *et al* 1995) and it enters daily torpor if it has not fed and the temperature falls below 26°C (Churchill 1998). The EBB feeds largely in heathland and swamp forest, foraging for pollen and nectar, usually from *Banksia* but also from *Callistemon salignus* and Pink Bloodwood (Smith *et al* 1995). In northern New South Wales the CBB has a foraging area of about 4-13ha, which it utilises continuously and it appears to defend the food resource from other bats (Churchill 1998).

The EBB roosts in rainforest or swamp forest adjacent to or near (50m-4km) the foraging resource (Churchill 1998). They roost individually amongst large leaves in the canopy or subcanopy, utilising the same area of forest, but often changing roost sites daily according to weather conditions (Smith *et al* 1995).

Females give birth in Spring and possibly again in Autumn (Smith *et al* 1995, Churchill 1998). Lactation lasts approximately 3 months.

HABITAT ON SITE/PROPERTY AND EXTENT OF LOCAL POPULATION:

The EBB has not been recorded on the property but was not specifically targeted. It has been recorded roosting in the nearby littoral rainforest (Parker 2002), and while the most optimum habitat is likely to occur north of Lake Cathie in Lake Innes Nature Reserve and south of Bonny Hills in Queens Lake Nature Reserve, it may occur opportunistically on the property using limited resources such as Bloodwoods, Blackbutts, Swamp Mahogany, Forest Red Gum and White Banksia as part of its seasonally nomadic foraging range. Given the ecology of the species and limitations of the property, the local population would extend well beyond the property.

APPENDIX 3: Plant Species List

Table 13: Plant species list

COMMON NAME	SCIENTIFIC NAME
Canopy Trees	
Swamp Oak	<i>Casuarina glauca</i>
Forest Red Gum	<i>Eucalyptus tereticornis</i>
Swamp Mahogany	<i>Eucalyptus robusta</i>
Northern Grey Ironbark	<i>Eucalyptus siderophloia</i>
Small-Fruited Grey Gum	<i>Eucalyptus propinqua</i>
Tallowwood	<i>Eucalyptus microcorys</i>
Brush Box	<i>Lophostemon confertus</i>
Coast Blackbutt	<i>Eucalyptus pilularis</i>
Grey Ironbark	<i>Eucalyptus siderophloia</i>
Broad-Leaved White Mahogany	<i>Eucalyptus umbra</i>
Needlebark Stringybark	<i>Eucalyptus planchoniana</i>
Red Mahogany	<i>Eucalyptus resinifera</i>
Lemon Scented Gum	<i>Corymbia citriodora</i>
Sydney Blue Gum	<i>Eucalyptus salignus</i>
Moreton Bay Fig	<i>Ficus macrophylla</i>
Broad Leaved Paperbark	<i>Melaleuca quinquenervia</i>
Spotted Gum	<i>Corymbia maculata</i>
Pink Bloodwood	<i>Corymbia intermedia</i>
Understorey Trees	
Hickory Wattle	<i>Acacia implexa</i>
Willow Bottlebrush	<i>Callistemon salignus</i>
Willow-Leaved Hakea	<i>Hakea salicifolia</i>
Coastal Banksia	<i>Banksia integrifolia</i>
Cheese Tree	<i>Glochidion ferdinandi</i>
Boobialla	<i>Myoporum acuminatum</i>
Prickly-Leaved Paperbark	<i>Melaleuca styphelioides</i>
Narrow-Leaved Melaleuca	<i>M. linariifolia</i>
Old Man Banksia	<i>Banksia serrata</i>
Blueberry Ash	<i>Elaeocarpus reticulatus</i>
Lilly Pilly	<i>Acmena smithii</i>
Satinwood	<i>Phebalium squaneum</i>
Hard Quandong	<i>Elaeocarpus obovatus</i>
Common Acronychia	<i>Acronychia oblongifolia</i>
Coastal Tea Tree	<i>Leptospermum laevigatum</i>
Cherry Ballart	<i>Exocarpus cupressiformis</i>
Black Oak	<i>Allocasuarina littoralis</i>
Broombush	<i>Monotoca scoparia</i>
Brush Muttonwood	<i>Rapanea howittiana</i>

<i>Shrubs</i>	
Wallum Bottlebrush	<i>Callistemon pachyphyllus</i>
Coastal Tea Tree	<i>Leptospermum laevigatum</i>
Narrow-Leaved Melaleuca	<i>Melaleuca linariifolia</i>
Swamp Banksia	<i>Banksia robur</i>
Bush Candles	<i>B. spinulosa</i> var. <i>collina</i>
Heath Banksia	<i>Banksia ericifolia</i> var. <i>macrantha</i>
Wallum Beard Heath	<i>Leucopogon lanceolatus</i>
Prickly Beared Heath	<i>Leucopogon juniperinus</i>
Native Broom	<i>Viminaria juncea</i>
Handsome Flat Pea	<i>Platylobium formosum</i>
Wallum Heath	<i>Epacris pulchella</i>
Lantana	* <i>Lantana camara</i>
Bitou Bush*	<i>Chrysanthemoides monilifera</i>
Sydney Golden Wattle	<i>Acacia longifolia</i>
Sickle Wattle	<i>A. falcata</i>
Sweet Wattle	<i>A. suaveolens</i>
Palm Lily	<i>Cordyline stricta</i>
-	<i>Boronia pinnata</i>
Orange Thorn	<i>Citriobatus pauciflorus</i>
Sieber's Paperbark	<i>Melaleuca sieberi</i>
Ball Honey Myrtle	<i>Melaleuca nodosa</i>
Wilkiea	<i>Wilkiea huegeliana</i>
Mock Olive	<i>Notelaea longifolia</i>
Slender Tea Tree	<i>Leptospermum polygalifolium</i>
Rough Pittosporum	<i>Pittosporum revolutum</i>
Common Pittosporum	<i>P. undulatum</i>
-	<i>Pomaderris ligustrina</i>
Native Raspberry	<i>Rubus parviflorus</i>
Crinklebush	<i>Lomatia salicifolia</i>
Dogwood	<i>Jacksonia scoparia</i>
Geebung	<i>Persoonia levis</i>
Coffee Bush	<i>Breynia oblongifolia</i>
Graceful Bush Pea	<i>Pultenaea flexilis</i>
-	<i>Pultenaea retusa</i>
-	<i>P. villosa</i>
Common Acronychia	<i>Acronychia oblongifolia</i>
Grass Tree	<i>Xanthorrhoea</i> spp