Lake Claremont Management Plan 2016 - 21

FAUNA VALUES - APPENDIX 3

TOWN OF CLAREMONT
Est 1898

Development

Natural Area Holdings Pty Ltd, trading as Natural Area Consulting Management Services (Natural Area), wrote the first four drafts of this management plan with guidance and assistance from officers of the Town. The Lake Claremont Advisory Committee, Friends of Lake Claremont and the Claremont Council revised those drafts.

Officers of the Town of Claremont completed subsequent drafts of this management plan and appendices.

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Natural Area Holdings Pty Ltd, trading as Natural Area Consulting Management Services (Natural Area), has prepared Drafts 1 to 4 of this plan for the sole use of the Client to assist with assessing the suitability of our proposed solution/s and engaging our services. This document may not be relied upon by any other party without the express written agreement of Natural Area.

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Document Control

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Contents

1.0 Fauna Values

Numerous environmental factors influence the presence of fauna at the Lake Claremont, including the flora, the position within the landscape and habitat structure. With a winter-wet, ephemeral wetland surrounded by a buffer of mainly indigenous riparian vegetation and dry land patches of remnant and revegetated Banksia Eucalypt woodland, the site supports a diverse array of terrestrial and aquatic birds and other types of fauna. A review of NatureMap (Department of Parks and Wildlife, 2014c), Birds Australia (2003), the Town of Claremont (2014 and 2015 pers. com.) indicate fauna of the Lake Claremont and its surrounds is likely to include:

- 4 species of amphibians;
- 96 species of birds;
- 61 taxa of aquatic macroinvertebrates;
- 42 terrestrial macroinvertebrates;
- 12 mammals; and
- 24 reptiles.

While NatureMap can be searched as a polygon, Natural Area selected a 2 km buffer search to provide an indication of species that could occur around and migrate to Lake Claremont. In some cases, the listed species will be an indication of what have occurred in the past, prior to the changes that have taken place at the site since European settlement. Urbanisation related disturbances, along with the presence of foxes, dogs and cats mean that the current abundance of and diversity of indigenous fauna is much lower than the carrying capacity of the habitat. Species lists appear in Sections 3.2 and 3.3.

1.1 Birds

Birds are the most diverse vertebrate group to utilise the area with both wetland and dry land species present. Volunteers connected with FOLC and national birding associations have carried out bird surveys at Lake Claremont on a quarterly basis since 1993. Data from these surveys is available on request from the Town of Claremont (TOC).

The lake has a range of water depths that cater to a range of grazing birds, such as ibis and heron, as well as deeper water areas that cater to swans that feed from the lake bottom if it is within reach of their long neck, and diving birds such as some of the ducks and grebes. Islands, artificial nest boxes, naturally recruiting emergent plants and dead tree trunks within the lake bed provide refuge and roosting areas for birds away from predators such as foxes, dogs and cats. The presence of small bush birds such as thornbills and wrens are an indicator of revegetation success. Photographs of a sample of the bird species sighted at Lake Claremont appear in Section 3.1.

Bird species present at the site included a number of introduced species, namely:

- Rainbow Lorikeet (*Trichoglossus haematodus*)
- Laughing Kookaburra (*Dacelo novaehollandiae*)
- Laughing Turtledove (*Streptopelia chinensis*)
- Spotted Turtledove (*Streptopelia senegalensis*)
- Little Corella (*Cacatua sanguinea*)
- Long Billed Corella (*Cacatua tenuirostris*)

The Rainbow Lorikeet, Long Billed and the Little Corella are known to compete with native bird and mammal species for nesting hollows and Natural Area observes a nesting box in the north-western portion of the nature space occupied by Rainbow Lorikeets. Ravens are highly intelligent ferocious omnivores that predate frogs, smaller adults and chicks of smaller bird species and turtles. Their predatory habits, ability to communicate and remember locations of food and large flock sizes supported by scraps and pet feeding stations is now having a major impact on the indigenous fauna of the site. These pest species are or are likely to become problematic within the area and active control may be required to reduce numbers to an acceptable level. The introduced Kookaburra also competes with native species for reptiles, bush birds, and other small prey species. However, there would be major cultural issues associated with the control of this iconic Australian species. Impacts associated with the introduced Rock Doves (pigeons), Spotted Doves and Turtle Doves do not appear significant at this time.

1.2 Mammals

Mammals present at Lake Claremont are limited due to disturbances at the site over many years. The most common mammal species encountered are the non-native mammals, including dogs (*Canis familiaris*), with domestic and feral cats (*Felis catus*) and foxes (*Vulpes vulpes*) also known at the site.

1.2.1 Native Mammals

The presence of other mammals is likely to be limited to bats and the occasional possum. The Chocolate Wattled Bat (*Chalinolobus morio*) and the Gould's Wattled Bat (*Chalinolobus gouldii*) have been recorded at the site (Head 2014 pers comm), and Brush-tailed Possum (*Trichosurus vulpecula subsp. vulpecula*) was noted in 2013 (Friends of Lake Claremont 2015 pers comm). Species such as the quoll and kangaroo have been locally extinct at the site for many years.

1.2.2 Dogs

The recreational aspects of dog walking and off leash dog exercise are discussed in Section 2.1.3 of the Lake Claremont Management Plan. However, dogs are also relevant to fauna management at the site. This primary relates to owners and handlers who do not adhere to requirements to keep dogs on the leash in designated areas or allow their dog(s) to wander uncontrolled. Under the *Dog Act 1976* (WA) the owner or person in control of a dog must ensure that:

- it does not attack or chase people or animals;
- it is wearing a suitable collar and identification tags; and
- if the dog is being exercised off the leash, that the leash can be readily reattached as required.

When a dog is unrestrained, there is the potential for it to harass native birds and other native fauna species. In addition to injury or death, such incidents can interrupt feeding, result in nests with eggs/chicks being abandoned and stress which drives native fauna from the site. For this reason the *Wildlife Conservation Act 1950* (WA) places heavy penalties on the owners of dogs that harass and/or kill wildlife.

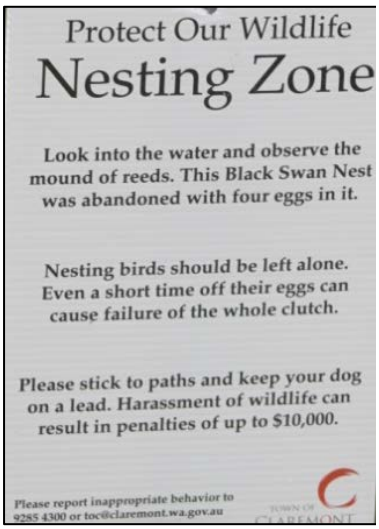


Figure 1: Sign indicating impacts of dogs on birds

During site assessment activities by Natural Area, a number of dogs were observed being exercised off their leash outside the designated dog exercise area. A notice on the lake bank near the western side indicated that a pair of swans had abandoned a nest with four eggs as a direct result of dog(s) (Figure 1). Since winter

2014, dog attacks have killed a nesting Black Pacific Duck in the remnant bushland, an adult Australian Shellduck on the turf area at Stirling Road Park and two fledgling cygnets from both the winter 2014 and winter 2015 broods were found dead with broken necks inside the dog prohibited zone at the southern end of the lake. Natural Area recommended a greater focus on education of dog owners utilising Lake Claremont and enforcement of compliance with the *Dog Act 1976* (WA), especially with regard to restricted zones and leash requirements in designated areas of the Lake Claremont.

1.2.3 Cats

Free roaming domestic and feral cats have been observed at Lake Claremont attacking and killing wildlife, including birds and lizards (Head 2014 pers. comm.). The implementation of the *Cat Act 2011* (WA) requires owners to take responsibility for their animals and ensure they are sterilised, micro-chipped, and are wearing registration tags when in a public place. The Town of Claremont can impound cats roaming free within public places. Natural Area's review of the Town of Claremont website revealed little information on the provisions of the *Cat Act 2011* (WA) and found no evidence of a Cat Local Law. Natural Area recommended the development of a Cat Local Law and education package, including information added to the Town website, to inform the community of requirements and expectations associated with the full introduction of the *Cat Act 2011* (WA).

1.2.4 Foxes

Red Foxes (*Vulpes vulpes*) frequent Lake Claremont. While families of foxes were known to inhabit the den on the eastern peninsular in the past, they were eradicated and current foxes are considered transient visitors to the site (Head 2014 pers. comm.).

1.3 Reptiles

One of the most commonly seen reptiles recorded at Lake Claremont is the Southwestern Snake-necked Turtle (Figure 2) or Narrow-breasted Snake-necked Turtle (*Chelodina colliei*). Previously, this species was known as 'Oblong Turtles' based on the previous wrongly assigned scientific name of *Chelodina oblonga*. Turtles aestivate in the mud of the lakebed during dry conditions and quickly become active in cooler months when water levels within the lake rise.

Figure 2: *Chelodina colliei* – Southwestern or Narrow-breasted Snake-necked Turtle

A minimum of 15 lizard species are indicated on the NatureMap Report (Department of Parks and Wildlife 2014) as having the potential to occur at Lake Claremont. Species include skinks, monitors and blue-tongue/bobtail lizards. This species richness is likely to be an under-representation given the differing habitat types offered in and around Lake Claremont. While NatureMap reports eight snake species as possibly occurring at Lake Claremont, the high level of urbanisation in the surrounding area is likely to limit the actual number of species present. Reptiles recorded at the site include the Shingleback or Bobtail (*Tiliqua rugosa*), Blue Tongue (*Tiliqua occipitalis*), Jan's Banded Snake (*Simoselaps bertholdi*) and the Dugite (*Pseudonaja affinis affinis*) (Head 2014 pers. comm.).

1.4 Amphibians

The presence of frogs and other amphibians is an indicator of a wetland area in 'good' condition. NatureMap indicates the probable presence of four amphibians within Lake Claremont, with the likelihood of more species being present with the range of habitats and food sources available.

1.5 Invertebrates

NatureMap indicates the potential presence of a minimum of 42 terrestrial invertebrate species at Lake Claremont, with the likelihood that the number is much higher. Of note is the presence of the European Honeybee (*Apis mellifera*) which competes with native birds and other fauna species for nectar and tree hollows and other locations to create their hives. However, this competition needs to be balanced against the pollination services the introduced bees contribute in the absence of small mammals and some of the terrestrial bird species that would be expected in pristine natural bushland. On occasion the location of hives are in close proximity to where human activities occur within the site or they impact on the breeding of native bird species, so removal may be necessary and will be carried out in accordance with TOC's feral bee management practices.

Investigations of aquatic invertebrate species carried out by Murdoch University between 2012 and 2014 have identified species from 43 families and 66 genera (Section 3.3). As identification to species level was carried out in only a few instances, the actual aquatic species diversity will be much higher. A review of the taxa known to respond positively or negatively to eutrophication indicates the presence of many that are intolerant of eutrophication, such as the *Anisoptera* and some *Hemiptera* species (Davis and Christidis 1997). This finding is consistent with the documented improvement in water quality and revegetation activities that have occurred in recent years.

1.6 Significant Fauna Species

The NatureMap report identifies a number of bird, reptile, mammal and invertebrate species as being conservation significant, either being listed under the *Wildlife Protection Act 1950* (WA) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth). These species are highlighted on the composite list provided in Section 3.2, and an explanation of conservation codes is provided in Section 3.4.

1.6.1 Birds

The following significant bird species appear on the NatureMap report:

- Six bird species protected under international agreements that have been sighted at the site: (Eastern Great Egret (*Ardea alba* synonym *Ardea modesta*); Sharp-tailed Sandpiper (*Calidris acuminate*); Rainbow Bee-eater (*Merops ornatus*); Caspian Tern (*Sterna caspia*); Wood Sandpiper *Tringa glareola*); and Common Greenshank (*Tringa nebularia*).

- The Priority 4 listed Australian Little Bittern (*Ixobrychus minutus* subsp. *dubius*) has been sighted at the lake and other Priority 4 bird species known to be found within the area include the Hooded Plover (*Charadrius rubricollis*) and Little Bittern (*Ixobrychus minutus*).
- Two threatened species sighted at the site are the Forest Red-tailed Cockatoo (*Calyptorhynchus banksia naso*) and the Carnaby's Cockatoo (*Calyptorhynchus latirostris*). The threatened Australasian Bittern (*Botaurus poiciloptilus*) has potential occur at the site.

In addition to the above bird species, the site is recognised in Bush Forever (Government of Western Australia, 2000) for species subject to the Japan-Australia and China-Australia migratory bird agreements.

1.6.2 Invertebrates

NatureMap nominated the Priority 4 Graceful Sun Moth (*Synemon gratiosa*) as the only conservation significant invertebrate species having the potential to occur at the Lake Claremont and its surrounds. The Graceful Sun Moth relies on the presence of *Lomandra maritima or hermaphrodita* for a significant portion of its life. As neither species has been recorded at the site, the presence of the Graceful Sun Moth is unlikely. The moth also inhabits Banksia Woodlands, so there is a possibility of reintroduction in the longer term as stands of Banksia habitat become established and mature within the revegetated areas.

1.6.3 Mammals

Two mammals as listed on NatureMap as being conservation significant are the threatened Chuditch or Western Quoll *Dasyurus geoffroii*) and the Priority 4 Native Water-rat (*Hydromys chrysogaster*). The Chuditch is not expected due to the urbanisation disturbances that have occurred at the site over time and the presence of foxes. The Native Water-rat is not expected due to the seasonal nature of the wetland and no other freshwater wetlands in close proximity that could provide a refuge during summer months.

1.6.4 Reptiles

The only conservation significant reptile species that NatureMap reports is the Priority 3 listed Black-striped Snake (*Neelaps calonotos*), but a sighting of this snake has not been recorded for the site.

2.0 Fauna Monitoring

Under current TOC budgets and staffing levels, volunteers the most likely groups to undertake fauna survey activities at Lake Claremont. The most common monitoring method for volunteers (citizen scientists) is the recording of targeted or opportunistic sightings of species. This method will usually involve individuals recording sightings of species each time they visit the site, or a group of volunteers arranging a fauna monitoring session on a particular date. The development of a simple recording instruments or applications that includes the date, time, observer and location will be useful. Species can be identified using a range of readily available references or by seeking assistance from a biologist, zoologist or other experienced person.

Observation methods include:

- Standing in one location for a nominated period of time and recording all species observed; this method will also enable an estimation of population numbers.
- Walking transects or grids and recording species.
- Photographing species during survey activities allows later identification of unfamiliar species.

- Trail cameras (camera traps) are also becoming increasingly common, however they need to be deployed and used in a manner that does not contravene the *Surveillance Devices Act 1998* (WA) by capturing identifiable images of people (i.e. covert vs overt photography).

Things to remember when undertaking fauna surveys:

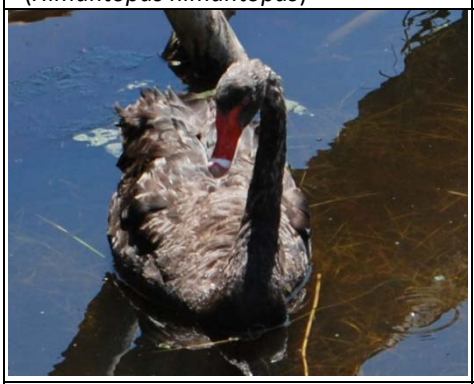
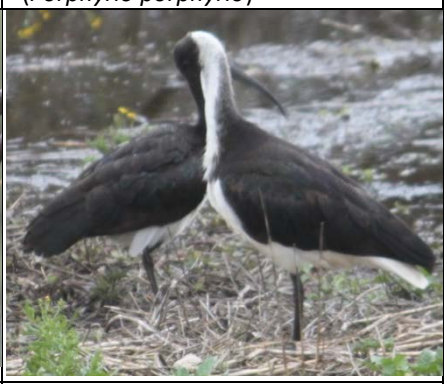
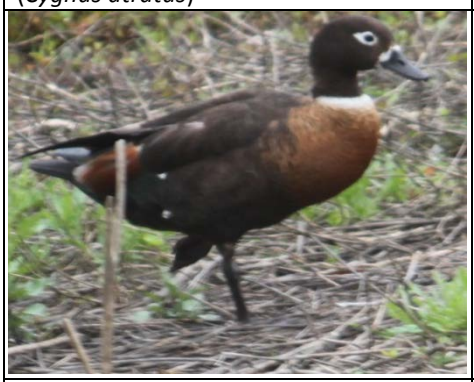
- Consider the timing of the day; some species are active throughout the day while others are more prevalent at dawn and dusk.
- Do not get too close to the animal(s) being observed.
- Keep observer numbers in a particular area to a minimum (e.g. one or two), so animals are not crowded and become nervous.
- Photographing species is common, so a good camera with a zoom lens is a very useful tool.
- Look for secondary signs of animals such as their calls scats, tracks, dens, burrows, diggings and webs.
- For personal safety, consider the environment (e.g. keep out of the water and avoid getting too close to steep banks).
- Dress appropriately with trousers and enclosed shoes as a minimum.
- Frequently species names change, so ensure names are current when compiling the species lists.
- As familiarity with species is develops over time the ability to recognise a bird from its calls or the presence of a particular species because of its tracks becomes easier.

Useful references:

- Department of Parks and Wildlife have developed a series of standard operating procedures for fauna monitoring activities, including the remote operation of cameras and observing animals from secondary signs.
- Reference books include:
  - Tracks, Scats and Other Traces – A Field Guide to Australian Mammals (Triggs 2013).
  - Guide to the Wildlife of the Perth Region (Nevill 2005).
  - Field Companion to the Mammals of Australia (Van Dyck et al. 2013).
  - A Complete Guide to Reptiles of Australia (Wilson and Swan 2013).
  - Bird Field Guides – various authors and dates.

3.0 Supporting Data

3.1 Examples of Bird Species Utilising Lake Claremont

		
Black-winged Stilt (*Himantopus himantopus*)	Dusky Moorhen (*Gallinula tenebrosa*)	Purple Swamphen (*Porphyrio porphyrio*)
		
Black Swan (*Cygnus atratus*)	*Laughing Kookaburra (*Dacelo novaeguineae*)	Straw-necked Ibis (*Threskiornis spinicollis*)
		
Australian Shelduck (*Tadorna tadornoides*)	Australian White Ibis (*Threskiornis molucca*)	Pink-eared Duck (*Malacorhynchus membranaceus*)
		
Pacific Black Duck (*Anas superciliosa*)	Grey Butcherbird (*Cracticus torquatus*)	Red Wattlebird (*Anthochaera carunculata*)

		
*Rainbow Lorikeet (*Trichoglossus haematodus*)	Eurasian Coot (*Fulica atra*)	Silver Gull (*Larus novaehollandiae*)
		
Australasian Grebe (*Tachybaptus novaehollandiae*)	Willie Wagtail (*Rhipidura leucophrys*)	Australian Ringneck, Twenty-eight (*Barnardius zonarius*)

(* denotes introduced species)

3.2 Combined Species List

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Amphibian						
Anura	*Heleioporus eyrei*	Moaning Frog				
Anura	*Heleioporus psammophilus*	Sand Frog				
Anura	*Limnodynastes dorsalis*	Western Banjo Frog				
Anura	*Litoria moorei*	Motorbike Frog				
Bird						
Anseriformes	*Anas castanea*	Chestnut Teal			x	x
Anseriformes	*Anas gracilis*	Grey Teal			x	x
Anseriformes	*Anas platyrhynchos*	Mallard				
Anseriformes	*Anas rhynchotis*	Australasian (Australian) Shoveler			x	x
Anseriformes	*Anas superciliosa*	Pacific Black Duck			x	x
Anseriformes	*Aythya australis*	Hardhead			x	x
Anseriformes	*Biziura lobata*	Musk Duck			x	x
Anseriformes	*Chenonetta jubata*	Australian Wood Duck, Wood Duck			x	x
Anseriformes	*Cygnus atratus*	Black Swan			x	x
Anseriformes	*Malacorhynchus membranaceus*	Pink-eared Duck			x	x
Anseriformes	*Oxyura australis*	Blue-billed Duck			x	x
Anseriformes	*Stictonetta naevosa*	Freckled Duck			x	x
Anseriformes	*Tadorna tadornoides*	Australian Shelduck, Mountain Duck			x	x
Podicipediformes	*Podiceps cristatus*	Great Crested Grebe				x
Podicipediformes	*Poliocephalus poliocephalus*	Hoary-headed Grebe			x	x

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Podicipediformes	*Tachybaptus novaehollandiae*	Australasian Grebe, Black-throated Grebe			x	x
Pelecaniformes	*Anhinga melanogaster subsp. novaehollandiae*	Darter			x	x
Pelecaniformes	*Ardea alba*	Great Egret	IA		x	x
Pelecaniformes	*Pelecanus conspicillatus*	Australian Pelican				x
Pelecaniformes	*Phalacrocorax carbo*	Great Cormorant			x	x
Pelecaniformes	*Phalacrocorax melanoleucos subsp. melanoleucos*	Little Pied Cormorant			x	x
Pelecaniformes	*Phalacrocorax sulcirostris*	Little Black Cormorant			x	x
Pelecaniformes	*Phalacrocorax varius*	Pied Cormorant			x	x
Columbiformes	*Columba livia**	Domestic Pigeon, Rock Dove			x	x
Columbiformes	*Ocyphaps lophotes*	Crested Pigeon				
Columbiformes	*Streptopelia chinensis**	Spotted Turtle-Dove			x	x
Columbiformes	*Streptopelia senegalensis**	Laughing Turtle-Dove			x	x
Caprimulgiformes	*Podargus strigoides subsp. brachypterus*	Tawny Frogmouth			x	x
Procellariiformes	*Dicaeum hirundinaceum*	Mistletoebird				
Sphenisciformes	*Eudyptula minor subsp. novaehollandiae*	Little Penguin				
Ciconiiformes	*Ardea novaehollandiae*	White-faced Heron			x	x
Ciconiiformes	*Ardea pacifica*	White-necked Heron			x	x
Ciconiiformes	*Botaurus poiciloptilus*	Australasian Bittern	T			
Ciconiiformes	*Ixobrychus minutus subsp. dubius*	Australian Little Bittern	P4		x	
Ciconiiformes	*Nycticorax caledonicus*	Rufous (Nankeen) Night Heron			x	x
Ciconiiformes	*Platalea flavipes*	Yellow-billed Spoonbill			x	x
Ciconiiformes	*Plegadis falcinellus*	Glossy Ibis			x	x

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Ciconiiformes	*Threskiornis molucca*	Australian White Ibis			x	x
Ciconiiformes	*Threskiornis spinicollis*	Straw-necked Ibis			x	x
Falconiformes	*Accipiter cirrocephalus*	Collared Sparrowhawk			x	x
Falconiformes	*Accipiter fasciatus*	Brown Goshawk			x	x
Falconiformes	*Circus approximans*	Swamp Harrier			x	x
Falconiformes	*Elanus axillaris*	Black-shouldered Kite			x	x
Falconiformes	*Falco cenchroides*	Nankeen Kestrel, Australian Kestrel			x	x
Falconiformes	*Falco longipennis*	Australian Hobby			x	
Falconiformes	*Falco longipennis subsp. longipennis*	Australian Hobby			x	x
Falconiformes	*Haliastur sphenurus*	Whistling Kite			x	x
Gruiformes	*Fulica atra*	Eurasian Coot			x	x
Gruiformes	*Gallinula tenebrosa*	Dusky Moorhen			x	x
Gruiformes	*Gallinula ventralis*	Black-tailed Native Hen			x	x
Gruiformes	*Gallirallus philippensis*	Buff-banded Rail			x	x
Gruiformes	*Porphyrio porphyrio*	Purple Swamphen			x	x
Gruiformes	*Porzana fluminea*	Australian Spotted Crake			x	x
Gruiformes	*Porzana pusilla*	Baillon's Crake			x	x
Gruiformes	*Porzana tabuensis*	Spotless Crake			x	x
Charadriiformes	*Anous tenuirostris subsp. melanops*	Australian Lesser Noddy				
Charadriiformes	*Calidris acuminata*	Sharp-tailed Sandpiper	IA		x	x
Charadriiformes	*Calidris ferruginea*	Curlew Sandpiper				x
Charadriiformes	*Calidris subminuta*	Long-toed Stint			x	

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Charadriiformes	*Charadrius melanops*	Black-fronted Dotterel			x	x
Charadriiformes	*Charadrius rubricollis*	Hooded Plover	P4			
Charadriiformes	*Cladorhynchus leucocephalus*	Banded Stilt				x
Charadriiformes	*Erythrogonys cinctus*	Red-kneed Dotterel			x	x
Charadriiformes	*Haematopus longirostris*	Pied Oystercatcher				x
Charadriiformes	*Himantopus himantopus*	Black-winged Stilt			x	x
Charadriiformes	*Larus dominicanus*	Kelp Gull				
Charadriiformes	*Larus novaehollandiae*	Silver Gull			x	x
Charadriiformes	*Larus pacificus*	Pacific Gull				
Charadriiformes	*Recurvirostra novaehollandiae*	Red-necked Avocet			x	x
Charadriiformes	*Sterna bergii*	Crested Tern				x
Charadriiformes	*Sterna caspia*	Caspian Tern	IA		x	x
Charadriiformes	*Sterna fuscata subsp. nubilosa*	Sooty Tern				
Charadriiformes	*Sterna nereis*	Fairy Tern				x
Charadriiformes	*Tringa glareola*	Wood Sandpiper	IA		x	x
Charadriiformes	*Tringa hypoleucos*	Common Sandpiper				x
Charadriiformes	*Tringa nebularia*	Common Greenshank	IA		x	x
Charadriiformes	*Tringa stagnatilis*	Marsh Sandpiper			x	x
Charadriiformes	*Vanellus miles*	Masked Plover, Masked Lapwing			x	x
Psittaciformes	*Barnardius zonarius*	Australian Ringneck, Twenty-eight			x	x
Psittaciformes	*Cacatua roseicapilla*	Galah			x	x
Psittaciformes	*Cacatua sanguinea*	Little Corella			x	x

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Psittaciformes	*Cacatua tenuirostris**	Eastern Long-billed Corella			x	x
Psittaciformes	*Calyptorhynchus banksia naso*	Forest Red-tailed Cockatoo	T		x	x
Psittaciformes	*Calyptorhynchus latirostris*	Carnaby's Cockatoo	T		x	x
Psittaciformes	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet				
Psittaciformes	*Purpureicephalus spurius*	Red-capped Parrot				x
Psittaciformes	*Trichoglossus haematodus**	Rainbow Lorikeet			x	x
Cuculiformes	*Cacomantis flabelliformis*	Fan-tailed Cuckoo				
Cuculiformes	*Cacomantis pallidus*	Pallid Cuckoo			x	x
Cuculiformes	*Chrysococcyx lucidus subsp. plagosus*	Shining Bronze Cuckoo				
Strigiformes	*Ninox novaeseelandiae subsp. boobook*	Boobook Owl, Southern Boobook			x	x
Strigiformes	*Tyto alba*	Barn Owl				x
Coraciiformes	*Dacelo novaeguineae subsp. novaeguineae**	Laughing Kookaburra			x	x
Coraciiformes	*Daphoenositta chrysoptera subsp. pileata*	Varied Sittella, Black-capped Sittella				
Coraciiformes	*Merops ornatus*	Rainbow Bee-eater	IA		x	x
Coraciiformes	*Todiramphus sanctus*	Sacred Kingfisher			x	x
Passeriformes	*Acanthiza apicalis*	Broad-tailed Thornbill, Inland Thornbill			x	x
Passeriformes	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill				
Passeriformes	*Acanthorhynchus superciliosus*	Western Spinebill				x
Passeriformes	*Anthochaera carunculata*	Red Wattlebird			x	x
Passeriformes	*Anthochaera lunulata*	Western Little Wattlebird				
Passeriformes	*Anthus australis subsp. australis*	Australian Pipit				
Passeriformes	*Arctocephalus australis*	Australian Reed Warbler				

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Passeriformes	*Arctocephalus australis subsp. gouldi*	Australian Reed Warbler				
Passeriformes	*Arctocephalus stentoreus*	Clamorous Reed Warbler			x	x
Passeriformes	*Colluricincla harmonica subsp. rufiventris*	Grey Shrike-thrush				
Passeriformes	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike			x	x
Passeriformes	*Corvus coronoides subsp. perplexus*	Australian Raven			x	x
Passeriformes	*Corvus splendens*	House Crow				
Passeriformes	*Cracticus nigrogularis*	Pied Butcherbird				
Passeriformes	*Cracticus tibicen*	Australian Magpie			x	x
Passeriformes	*Cracticus torquatus*	Grey Butcherbird			x	x
Passeriformes	*Eopsaltria australis subsp. griseogularis*	Western Yellow Robin				
Passeriformes	*Eopsaltria georgiana*	White-breasted Robin				
Passeriformes	*Epthianura albifrons*	White-fronted Chat			x	x
Passeriformes	*Gerygone fusca*	Western Gerygone			x	
Passeriformes	*Grallina cyanoleuca*	Magpie-lark			x	x
Passeriformes	*Hirundo neoxena*	Welcome Swallow			x	x
Passeriformes	*Hirundo nigricans*	Tree Martin			x	x
Passeriformes	*Lalage tricolor*	White-winged Triller				
Passeriformes	*Lichenostomus virescens*	Singing Honeyeater			x	x
Passeriformes	*Lichmera indistincta*	Brown Honeyeater			x	x
Passeriformes	*Malurus lamberti*	Variegated Fairy-wren				
Passeriformes	*Malurus lamberti subsp. assimilis*	Variegated Fairy-wren				
Passeriformes	*Malurus splendens*	Splendid Fairy-wren			x	

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Passeriformes	*Megalurus gramineus*	Little Grassbird			x	x
Passeriformes	*Melopsittacus undulatus*	Budgerigar				
Passeriformes	*Myiagra inquieta*	Restless Flycatcher				
Passeriformes	*Pachycephala pectoralis*	Golden Whistler				
Passeriformes	*Pachycephala rufiventris*	Rufous Whistler			x	x
Passeriformes	*Pandion haliaetus*	Osprey				x
Passeriformes	*Pardalotus punctatus*	Spotted Pardalote				x
Passeriformes	*Pardalotus striatus*	Striated Pardalote			x	x
Passeriformes	*Petroica cucullata*	Hooded Robin				
Passeriformes	*Petroica goodenovii*	Red-capped Robin				
Passeriformes	*Petroica multicolor subsp. campbelli*	Scarlet Robin				
Passeriformes	*Phylidonyris nigra*	White-cheeked Honeyeater			x	x
Passeriformes	*Phylidonyris novaehollandiae*	New Holland Honeyeater			x	x
Passeriformes	*Rhipidura fuliginosa*	Grey Fantail			x	x
Passeriformes	*Rhipidura leucophrys*	Willie Wagtail			x	x
Passeriformes	*Sericornis frontalis subsp. maculatus*	White-browed Scrubwren				
Passeriformes	*Smicrornis brevirostris*	Weebill			x	x
Passeriformes	*Zosterops lateralis*	Grey-breasted White-eye, Silvereye			x	x
Passeriformes	*Zosterops lateralis*	Silvereye			x	
Invertebrates						
Araneae	*Aname mainae*	Black Wishbone Spider		x		
Araneae	*Araneus eburneiventris*	Orb-weaving Spider		x		

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Araneae	*Argiope trifasciata*	Banded Garden Spider		x		
Araneae	*Artoria linnaei*	Wolf Spider		x		
Araneae	*Artoria taeniifera*	Australian Wolf Spider		x		
Araneae	*Austracantha minax*	Christmas Spider		x		
Araneae	*Celaenia excavata*	Bird Dropping Spider		x		
Araneae	*Cryptoerithus quobba*	Long Spinneret Ground Spider		x		
Araneae	*Eriophora biapicata*	Garden Orb Weaving Spider		x		
Araneae	*Idiosoma sigillatum*	West Australian Trapdoor Spider		x		
Araneae	*Isopeda leishmanni*	Huntsman Spider		x		
Araneae	*Lampona brevipes*	White Tailed Spider		x		
Araneae	*Lampona cylindrata*	White Tailed Spider		x		
Araneae	*Missulena occatoria*	Red Headed Mouse Spider		x		
Araneae	*Mitzoruga insularis*	Ground Hunting Spider		x		
Araneae	*Molycria vokes*	Long Spinneret Ground Spider		x		
Araneae	*Oecobius navus*	Urban Wall Spider		x		
Araneae	*Pholcus phalangioides*	Daddy Long-legs Spider		x		
Araneae	*Raveniella arenacea*			x		
Araneae	*Raveniella subcirrata*			x		
Araneae	*Supunna funerea*	Sun Spider		x		
Araneae	*Tetragnatha demissa*	Long-jawed Spider		x		
Araneae	*Venator immansueta*	Western Rough Wolf Spider		x		
Araneae	*Westrarchaea sinuosa*			x		

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Geophilomorpha	*Mecistocephalus tahitiensis*	Marine Centipede		x		
Hymenoptera	*Apis mellifera**	European Honeybee				
Hymenoptera	*Polistes humilis*	Eastern Paper Wasp				
Ixodida	*Amblyomma triguttatum*	Kangaroo Tick		x		
Lepidoptera	*Pieris rapae*	Cabbage White Butterfly				
Lepidoptera	*Synemon gratiosa*	Graceful Sun Moth	P4	x		
Opiliones	*Ballarra longipalpus*	Harvestman Spider		x		
Pseudoscorpiones	*Geogarypus taylori*	Taylor's Pseudoscorpion		x		
Pseudoscorpiones	*Lamprochernes savignyi*	Turkish Pseudoscorpions		x		
Scolopendromorpha	*Cormocephalus aurantiipes*	Orange-footed Centipede		x		
Scolopendromorpha	*Cormocephalus rubriceps*	Giant Centipede		x		
Scolopendromorpha	*Notiasemus glauerti*	Centipede		x		
Scorpiones	*Cercophonius granulosus*	Bark Scorpion		x		
Scorpiones	*Cercophonius sulcatus*	Bark Scorpion		x		
Scorpiones	*Urodacus novaehollandiae*	Sand Scorpion		x		
Scorpiones	*Urodacus planimanus*	Black Scorpion, Rock Scorpion		x		
Scutigeromorpha	*Allothereua maculata*	House Centipede		x		
Trombidiformes	*Erythracarus decoris*	Free Living Mite		x		
Mammal						
Carnivora	*Canis familiaris**	Domestic Dog			x	
Carnivora	*Felis catus**	Domestic Cat			x	
Chiroptera	*Chalinolobus gouldii*	Gould's Wattled Bat		x	x	

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Chiroptera	*Chalinolobus morio*	Chocolate Wattled Bat		x	x	
Chiroptera	*Vespadelus regulus*	Southern Forest Bat		x		
Dasyuromorphia	*Dasyurus geoffroii*	Chuditch, Western Quoll	T	x		
Diprotodontia	*Macropus fuliginosus*	Western Grey Kangaroo		x		
Diprotodontia	*Trichosurus vulpecula subsp. vulpecula*	Common Brushtail Possum		x	x	
Rodentia	*Hydromys chrysogaster*	Water-rat	P4	x		
Rodentia	*Mus musculus**	House Mouse		x		
Rodentia	*Rattus fuscipes*	Western Bush Rat		x		
Rodentia	*Rattus rattus**	Black Rat		x		
Reptile						
Squamata	*Aprasia repens*	Sand-plain Worm-lizard		x		
Squamata	*Brachyurophis fasciolatus subsp. fasciolatus*	Narrow-banded Shovel-nosed Snake		x		
Squamata	*Ctenotus fallens*	West-coast Laterite Ctentotus		x		
Squamata	*Cyclodomorphus celatus*	Western Slender Blue-tongue		x		
Squamata	*Echiopsis curta*	Bardick		x		
Squamata	*Egernia napoleonis*	South-western Crevice-skink		x		
Squamata	*Hemiergis quadrilineata*	Two-toed Earless Skink		x		
Squamata	*Lerista elegans*	Elegant Slider, West-coast Four Toed Lerista		x		
Squamata	*Lerista lineopunctulata*	Dotted-line Robust Slider, West-coast Line Spotted Lerista		x		
Squamata	*Lerista praepedita*	Blunt-tailed West-coast Slider, Western Worm Lerista		x		
Squamata	*Lialis burtonis*	Burton's Legless Lizard		x		
Squamata	*Menetia greyii*	Common dwarf skink		x		

Taxonomic Order	Scientific Name	Common Name	Cons. Code	NM	ToC	BA
Squamata	*Neelaps bimaculatus*	Black-naped Snake		x		
Squamata	*Neelaps calonotos*	Black-striped Snake	P3	x		
Squamata	*Notechis scutatus*	Tiger Snake			x	
Squamata	*Pseudechis australis*	Mulga Snake		x		
Squamata	*Pseudonaja affinis subsp. affinis*	Dugite		x	x	
Squamata	*Pseudonaja mengdeni*	Western Brown Snake		x		
Squamata	*Pygopus lepidopodus*	Common Scaly Foot		x		
Squamata	*Ramphotyphlops australis*	Southern Blind Snake		x		
Squamata	*Simoselaps bertholdi*	Jan's Banded Snake		x	x	
Squamata	*Strophurus spinigerus subsp. spinigerus*	South-west Spiny-tailed Gecko		x		
Squamata	*Tiliqua occipitalis*	Western Bluetongue		x	x	
Squamata	*Tiliqua rugosa*	Shingleback, Bobtail			x	
Squamata	*Varanus gouldii*	Sand Monitor, Bungarra		x		
Testudines	*Chelodina colliei*	Oblong Turtle		x	x	

(Sources: NatureMap (NM), Town of Claremont (ToC), Birds Australia (BA))

* Denotes introduced species

3.3 Aquatic Invertebrates (Murdoch University Surveys)

Phylum/Class	Class/Order	Family	Genus/Species	Common Name
Annelida	Hirudinea			Leaches
Annelida	Oligochaeta			Aquatic earthworms; Freshwater worms
Arachnida	Acariformes	Arrenuridae	*Arrenuridae spp.*	Water mites
Arachnida	Acariformes	Eylaidae	*Eylais spp.*	Red water mites
Arachnida	Acariformes	Hydrachnidae	*Hydrachna spp.*	Red water mites
Arachnida	Acariformes	Hydrodromidae	*Hydrodroma spp.*	Red water mites
Arachnida	Acariformes	Limnesiidae	*Limnesia spp.*	Water mites
Arachnida	Acariformes	Oxidae	*Oxus spp.*	Water mites
Arachnida	Acariformes	Pionidae		Water mites
Arachnida	Acariformes	Unionicolidae		Water mites
Arachnida	Araneae	Pisauridae		Fishing Spiders; Raft Spiders
Arachnida	Orbiatida			Beetle Mites
Crustacea	Amphipoda			Scuds
Crustacea	Anostraca			Fairy Shrimps
Crustacea	Cladocera			Water Fleas
Crustacea	Conchonstraca			Clam Shrimps
Crustacea	Copepoda			Copepods
Crustacea	Decapoda	Palaemonidae	*Palaemonetes australis*	Freshwater Prawns
Crustacea	Isopoda			Isopods
Crustacea	Notostraca			Shield Shrimps; Tadpole Shrimps
Crustacea	Ostracoda			Seed Shrimps
Crustacea	Syncarida			Syncarids

Phylum/Class	Class/Order	Family	Genus/Species	Common Name
Insecta	Coleoptera	Chrysomelidae		Leaf Beetles
Insecta	Coleoptera	Curculionidae		Weevils
Insecta	Coleoptera	Dytiscidae		Diving Beetles
Insecta	Coleoptera	Haliplidae		Crawling Water Beetles
Insecta	Coleoptera	Hydrophilidae		Water Scavenger Beetles
Insecta	Coleoptera	Ptiliidae		Feather winged Beetles
Insecta	Coleoptera	Scirtidae		Marsh Beetles
Insecta	Collembola			Spring Tails
Insecta	Diptera	Ceratopogonidae		Biting Midges
Insecta	Diptera	Chironmidea		Non-Biting Midges
Insecta	Diptera	Culicidae	*Aedes spp.*	Mosquitoes
Insecta	Diptera	Culicidae	*Coquillettidia spp.*	Mosquitoes
Insecta	Diptera	Culicidae	*Culex spp*	Mosquitoes
Insecta	Diptera	Statiomidae		Blackflies
Insecta	Diptera	Stratiomyidae		Soldier Flies
Insecta	Diptera	Tabanidae		March Flies
Insecta	Diptera	Tipulidae		Crane Flies
Insecta	Ephemoptera	Baetidae	*Cloen sp.*	Mayflies
Insecta	Ephemoptera	Caenidae	*Tasmanocoenis sp.*	Mayflies
Insecta	Hemiptera	Corixidae		Water Boastmen
Insecta	Hemiptera	Naucoridae		Creeping Water Bugs or Saucer Bugs
Insecta	Hemiptera	Nepidae		Water Scorpions
Insecta	Hemiptera	Notonectidae		Backswimmers

Phylum/Class	Class/Order	Family	Genus/Species	Common Name
Insecta	Hemiptera	Pleidae	*Plea brunni*	Pygmy Backswimmers
Insecta/Odonata	Anisoptera	Aeshnidae	*Aeshna brevistyla* syn. *Adversaeschna brevistyla*	Blue-spotted Hawker Dragonflies; Lancer Dragonflies
Insecta/Odonata	Anisoptera	Aeshnidae	*Hemianax papuensis*	Australian Emperor Dragonfly; Yellow Emperor Dragonfly
Insecta/Odonata	Anisoptera	Libellulidae	*Diplacodes bipunctata*	Wandering Percher Dragonflies
Insecta/Odonata	Anisoptera	Libellulidae	*Orthetrum caledonicum*	Blue Skimmer Dragonflies
Insecta/Odonata	Zygoptera	Lestidae	*Austrolestes analis*	Slender Ringtail Damselflies
Insecta/Odonata	Zygoptera	Lestidae	*Austrolestes annulosus*	Blue Ringtail Damselflies
Insecta/Odonata	Zygoptera	Coenagrionidae	*Xanthagrion erythroneurun*	Red and Blue Damselflies
Insecta	Plecoptera			Stoneflies
Insecta	Trichoptera	Hydroptildae	*Acritoptila globosa*	Caddisflies
Insecta	Trichoptera	Leptoceridae		Caddisflies
Mollusca	Bivalvia	Sphaeriidae	*Sphaerium kendricki*	Pea Clams; Pea Shells
Mollusca	Gastropoda	Hydrobiidae	*Potamopyrgus sp.*	Mud Snails
Mollusca	Gastropoda	Lymnaeidae	*Pseudosuccinea columella**	American Ribbed Fluke Snail
Mollusca	Gastropoda	Physidae	*Succinea australis*	Striate Ambersnail
Mollusca	Gastropoda	Pomatiopsidae	*Coxiella striatula*	Salt Lake Snails
Mollusca	Gastropoda	Planorbidae	*Ferrissia sp.*	Freshwater Limpet
Mollusca	Gastropoda	Planorbidae	*Glyptophysa sp.*	Freshwater snails
Mollusca	Gastropoda	Planorbidae	*Isidorella newcombi*	Newcomb's Pouch-snail
Nematoda				Nematods; Round Worms
Platyhelminthes	Turbellaria			Flat Worms

3.4 Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct (Schedule 1 of the *Wildlife Conservation Act* 1950) Taxa that have been adequately searched for and deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X	Presumed Extinct	Flora or fauna that is presumed to be extinct in the wild (Schedule 2 of the *Wildlife Conservation Act* 1950) Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
IA	International Agreement	Birds protected under international agreement (Schedule 3 of the *Wildlife Conservation Act* 1950) Birds that are subject to an agreement between governments of Australia and other countries relating to the protection of migratory birds and birds in danger of extinction
S	Specially Protected	Other specially protected fauna (Schedule 4 of the *Wildlife Conservation Act* 1950) Fauna that is in need of special protection, otherwise than for the reasons listed in other schedules of the *Wildlife Conservation Act* 1950.
Schedule 1 species that are ranked by the DEC according to their level of threat using IUCN Red List criteria		
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild
EN	Endangered	Species considered to be facing a very high risk of extinction within the wild
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild
Taxa that have not been adequately surveyed for listing under Schedule 1 or 2 of the Wildlife Protection Act are added to the Priority Lists under priorities 1, 2 or 3, according to the priority for further survey and evaluation of their conservation status.		
1	Priority One	Poorly known taxa Taxa which are known from one or a few collections or sight records (generally <5), on all lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
2	Priority Two	Poorly known taxa

Conservation Code	Name	Description
		Taxa which are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes
3	Priority Three	Poorly known taxa Taxa that are known collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
4	Priority Four	Rare or near threatened and other taxa in need of monitoring Rare: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. Near threatened: Taxa that are considered to have been adequately surveyed and that to not qualify for Conservation Dependent, but that are close to qualifying for vulnerable. Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
5	Priority Five	Conservation Dependent Taxa Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxa becoming threatened within five years.

(Source: Department of Parks and Wildlife, 2014)

Commonwealth

Category	Description
Critically Endangered	Taxa facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Taxa facing a very high risk of extinction in the wild in the near future
Vulnerable	Taxa facing a high risk of extinction in the wild in the medium term

(Source: Department of Sustainability, Environment, Water, Population and Communities, 2014)

4.0 References

Birds Australia. (2003). *Birds in and Around Lake Claremont*. Birds Australia.

Cat Act 2011 (WA)

City of Nedlands. (2014). *Dog Exercise*. Retrieved November 2014 from http://www.nedlands.wa.gov.au/exercise-areas.

Davis, J., and Christidis, F. (1997). *A Guide to Wetland Invertebrates of Southwestern Australia*. Western Australian Museum, Perth, Western Australia.

Department of Parks and Wildlife. (2014). *NatureMap Report – Lake Claremont, 2 km search buffer area*. Retrieved in October 2014 from http://naturemap.dpaw.wa.gov.au/default.aspx.

Dog Act 1976 (WA)

Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)

Friends of Lake Claremont. (2014). *Flora and Fauna*. Retrieved October 2014 from http://friendsoflakeclaremont.org/?page_id=189.

Head, A. (2014 & 2015). Town of Claremont. Personal Communications.

Neville, S. (2005). *Guide to the Wildlife of the Perth Region*. Simon Neville Publications, Perth, Western Australia

Surveillance Devices Act 1998 (WA)

Simpson, G. (2014). Town of Claremont. Personal Communication.

Town of Claremont. (2012). *Town of Claremont Dogs Local Law 2012*. Retrieved November 2014 from: http://www.claremont.wa.gov.au/Libraries/ContentDocs/Dog_Local_Law_2012_with_Council_resolution.sflb.ashx

Triggs, B. (2013). *Tracks, Scats and Other Traces – A Field Guide to Australian Mammals*. Oxford University Press, Melbourne, Australia.

Van Dyck, S., Gynether, I., and Baker, A., (Editors). (2013). *Field Companion to the Mammals of Australia*. New Holland Publishers, Sydney Australia.

Wildlife Conservation Act 1950 (WA)

Wilson, S., and Swan, G. (2013). *A Complete Guide to Reptiles of Australia* (4th Edition). New Holland Publishers, Sydney Australia.