

APPENDIX 4: SITE PROFILES

Summary table

Ranking	Site No.	Site	Fauna Diversity Values	Local Government Area	Land Management
Highest	1	Royal National Park	Extremely high fauna diversity: coastal, wetland, heath, bushland, rainforest, wetlands	Sutherland, Wollongong	DECC
	2	Towra Point	Very high fauna diversity: coastal, wetland, bushland; migratory waders; seabird/shorebird nesting	Sutherland	Mostly DECC, DPI
	3	Dharawal	Very high fauna diversity: heath, bushland; threatened frogs	Campbelltown, Wollondilly, Wollongong	Mostly DECC, Crown Reserve
	4	Botany Wetlands	High fauna diversity: coastal, wetland; drought refuge; seabird nesting; migratory waders	Botany Bay	Complex
	5	Holsworthy Military Reserve	Very high fauna diversity: heath; very large bushland area; little restricted public access; Cumberland Plain species	Campbelltown, Liverpool, Sutherland	Dept of Defense
	6	Middle Harbour Valley	High fauna diversity: heath, bushland; Grey-headed Flying-fox camp; Southern Brown Bandicoot	Ku-ring-gai, Manly, Warringah, Willoughby	Complex; including DECC
	7	Lower Georges River	High fauna diversity: estuarine, wetland, bushland; migratory waders	Bankstown, Hurstville, Sutherland	Complex; including DECC
	8	Kurnell	High fauna diversity: coastal, wetland, bushland; migratory waders; Grey-headed Flying-fox camp; threatened frogs	Sutherland	Complex
	9	Sydney Olympic Park	High fauna diversity: estuarine, wetland, bushland; waders; drought refuge; threatened frogs	Auburn, Canada Bay	Sydney Olympic Park Authority
	10	Ingleside-Warriewood	Very high fauna diversity: wetland, heath, bushland; threatened frogs	Pittwater	Complex
	11	Narrabeen Lake	High fauna diversity: coastal, wetland, heath, bushland	Pittwater, Warringah	Mostly Crown; Council
	12	Upper Georges River	Very high fauna diversity: bushland; important Koala habitat; Cumberland Plain species	Campbelltown	Complex
	13	Prospect Reservoir	High fauna diversity: wetland, bushland; drought refuge; waterfowl; Cumberland Plain species	Blacktown, Fairfield, Holroyd	Mostly DECC, SC Authority

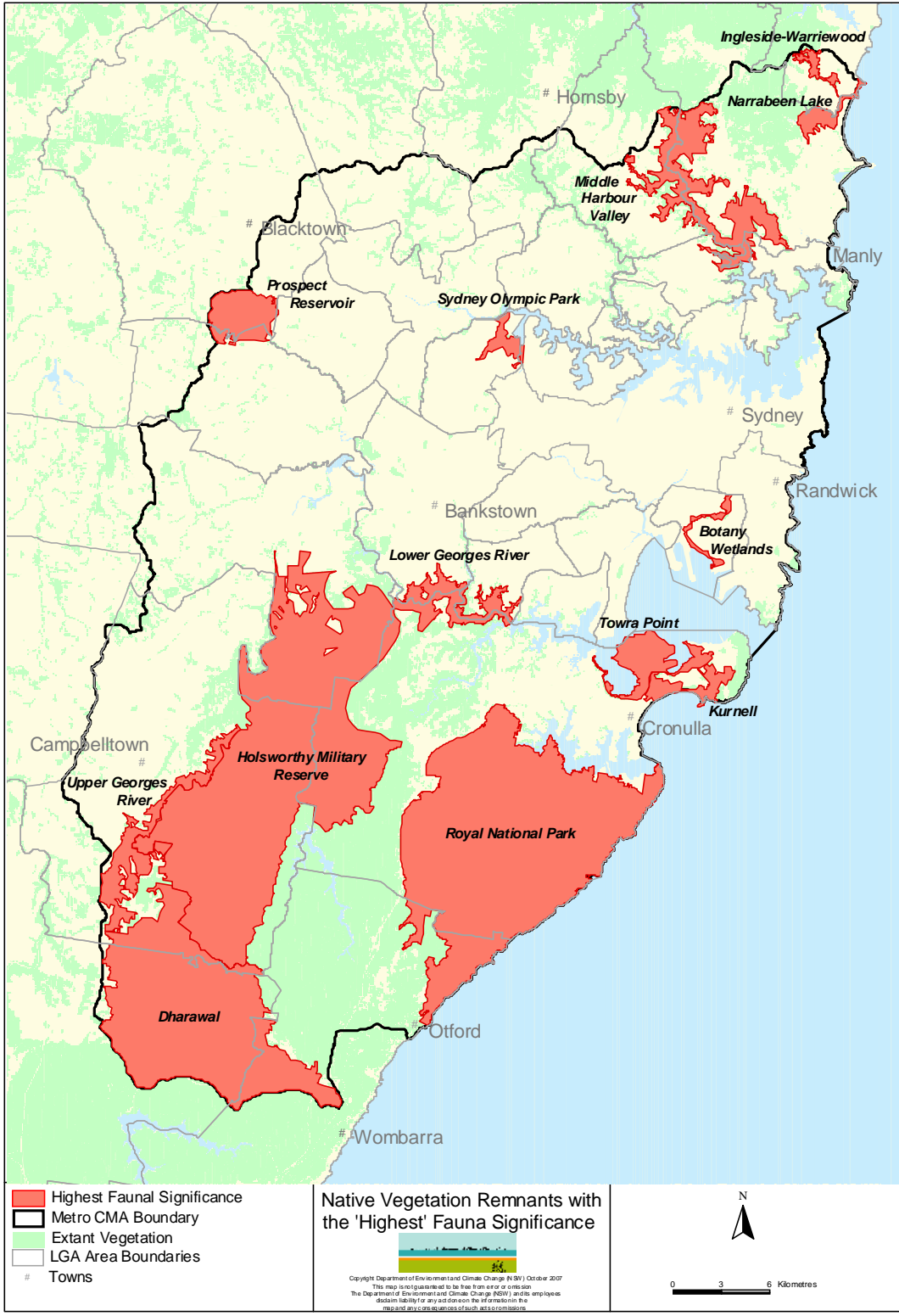
Ranking	Site No.	Site	Fauna Diversity Values	Local Government Area	Land Management
Very High	14	Dee Why Lagoon-Long Reef Point	High fauna diversity: coastal, wetland; migratory waders; drought refuge	Warringah	Mostly Council, Crown
	15	Garigal-Oxford Falls	High fauna diversity: heath, bushland; Southern Brown Bandicoot; threatened frogs	Pittwater, Warringah	Complex, including DECC
	16	Heathcote NP	High fauna diversity: heath, bushland; Eastern Horseshoe-bat roost; threatened frogs; Eastern Pygmy-possum	Sutherland, Wollongong	Mostly DECC
	17	Lane Cove Valley	High fauna diversity: estuarine, bushland	Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Ryde, Willoughby	Complex, including DECC
	18	Upper Hacking	High fauna diversity: rainforest species; cave-dwelling bats; Stuttering Frog	Wollongong	Mostly private
	19	Woronora Special Area	High fauna diversity: heath, bushland; threatened frogs; little public access	Campbelltown, Sutherland, Wollondilly, Wollongong	SC Authority
	20	Garawarra SCA	High fauna diversity: heath, bushland; rainforest species	Sutherland, Wollongong	Mostly DECC
	21	Port Hacking	Moderate fauna diversity: coastal; migratory waders	Sutherland	Complex
	22	Western Sydney RP	Moderate fauna diversity: Cumberland Plain species	Fairfield	DECC, Council
High	23	Botany Bay NP (Kurnell section)	Moderate fauna diversity: coastal, wetland, heath, bushland; threatened frogs	Sutherland	Mostly DECC
	24	Malabar Headland	Moderate fauna diversity: coastal, wetland, heath, bushland; cave-dwelling bats	Randwick	Mostly Commonwealth
	25	Chipping Norton	Moderate fauna diversity: wetland, heath, bushland; Grey-headed Flying-fox camp; Cumberland Plain species	Bankstown, Fairfield, Liverpool	Mostly Council, Crown
	26	Menai	Moderate fauna diversity: heath, bushland; threatened frogs	Sutherland	Complex
	27	Woronora River	Moderate fauna diversity: heath, bushland; cave-dwelling bats; threatened owls; migratory waders	Sutherland	Complex
	28	Hammondville-Pleasure Point	Moderate fauna diversity: wetland, heath, bushland; threatened frogs; Cumberland Plain species; Koala	Bankstown, Liverpool	Complex
	29	Long Point-Casula	Moderate fauna diversity: wetland, bushland; threatened frogs; Cumberland Plain species	Campbelltown, Liverpool	Complex including DECC

Ranking	Site No.	Site	Fauna Diversity Values	Local Government Area	Land Management
High	30	Myrtle and Peter Meadows Creeks	Moderate fauna diversity: bushland; Cumberland Plain species; Koala	Campbelltown	Mostly Dept of Planning
	31	Botany Bay NP (La Perouse section)	Moderate fauna diversity: coastal, wetland, heath, bushland; cave-dwelling bats; threatened frogs	Randwick	Mostly DECC
	32	Illawong	Moderate fauna diversity: estuarine, wetland, bushland; migratory waders	Sutherland	Complex
	33	North Head	Moderate fauna diversity: coastal, heath, bushland; Little Penguin and Long-nosed Bandicoot endangered populations	Manly	Mostly DECC
	34	Darling Mills Creek-Cumberland SF-Lake Parramatta	Moderate fauna diversity: bushland	Baulkham Hills, Parramatta	Complex
	35	Duck River-Upper Parramatta River	Moderate fauna diversity: estuarine, wetland, bushland; two Grey-headed Flying-fox camps; threatened frogs; migratory waders; Cumberland Plain species	Auburn, Parramatta	Mostly Council
Moderate	36	Bradleys Head-Middle Head	Low to moderate fauna diversity: coastal, heath, bushland; cave-dwelling bats	Mosman	Mostly DECC
	37	Mirambeena	Low to moderate fauna diversity: wetland, bushland; White Ibis colony; Cumberland Plain species	Bankstown, Fairfield	Mostly Council
	38	Salt Pan Creek	Low to moderate fauna diversity: estuarine, bushland	Bankstown, Canterbury, Hurstville	Mostly Council
	39	Hoxton Park	Low to moderate fauna diversity: wetland, bushland; cave-dwelling bats; Cumberland Plain species	Liverpool	Complex
	40	Ingleburn	Low to moderate fauna diversity: wetland, bushland; little public access; Cumberland Plain species	Campbelltown, Liverpool	Mostly Commonwealth
	41	Devlins Creek	Low to moderate fauna diversity: bushland; cave-dwelling bats	Hornsby	Mostly Council
	42	Dobroyd Head	Low to moderate fauna diversity: coastal, heath, bushland; potential Little Penguin habitat	Manly	Mostly DECC
	43	Engadine	Low to moderate fauna diversity: bushland	Sutherland	Mostly Crown
	44	Denham Court	Low to moderate fauna diversity: bushland; Cumberland Plain species	Campbelltown	Mostly private

Ranking	Site No.	Site	Fauna Diversity Values	Local Government Area	Land Management
Moderate	45	Allenby Park	Low to moderate fauna diversity: heath, bushland; cave-dwelling bats	Warringah	Mostly Council
	46	Wolli Creek	Low to moderate fauna diversity: heath, bushland; Grey-headed Flying-fox camp	Canterbury, Rockdale	Mostly Council, DECC, Crown
	47	Curl Curl Lagoon	Low to moderate fauna diversity: coastal lagoon	Warringah	Mostly Council
	48	Quarry Branch Creek	Moderate fauna diversity: bushland	Parramatta	Mostly Council
	49	St Andrews	Low to moderate fauna diversity: bushland; Cumberland Plain species	Campbelltown	Mostly private
Low	50	Upper Toongabbie Creek	Low fauna diversity: bushland	Baulkham Hills	Mostly Council

Highest Ranking Fauna Sites

Thirteen sites of remnant bushland greater than 50ha in area within the CMA were identified as having the highest fauna ranking. The majority of these sites comprised large areas of larger than 1000ha (62%), with two sites of moderate size (Kurnell and Sydney Olympic Park) and two small sized areas (Botany Wetlands and Ingleside – Warriewood). Seven sites comprise land that is currently either totally or partially reserved as crown land for nature conservation and is managed by or on behalf of DECC. The remaining sites include Commonwealth Department of Defence land (Holsworthy Military Reserve), predominantly private land (Kurnell); freehold land held by the NSW Department of Planning (Upper Georges River) or land under a variety of tenures.



Map i: Native Vegetation Remnants with the Highest Fauna Significance

Site1: ROYAL NATIONAL PARK

Location:

This site comprises Royal NP excluding the coastal strip south of Bulgo (see Upper Hacking site) (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Hacking River

Local Government Area:

Sutherland and Wollongong

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	15254	99
Crown Land	18	<1
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	210	1
Total	15482	100

Environmental Setting:



Marley Lagoon supports an unconfirmed population of the endangered Green and Golden Bell Frog. M Schulz



Extensive heathlands are a feature of parts of the Park and formerly supported the threatened Ground Parrot. M. Schulz



The coastline of Royal NP is spectacular. M. Schulz

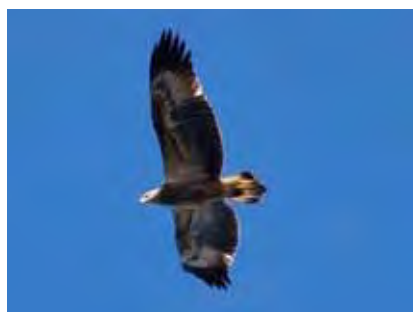
Royal NP is triangular in shape, bounded to the north by Port Hacking, to the east by the Pacific Ocean and to the west by the Southern Freeway, Old Princes Highway and the Illawarra Railway. It is the second oldest national park in the world (gazetted in 1879) and one of the first areas of land in Australia to be set aside specifically for conservation (NSW National Parks and Wildlife Service 2000b). Royal NP is located within a much larger protected area system that extends from this NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000). The site is located on the edge of the Woronora Plateau and is dominated by Hawkesbury Sandstone characterised by steep valleys and ridges, rocky outcrops and streams which are punctuated by waterfalls and pools and terminate in spectacular clifflines, a dominant feature along much of the coast. The middle section of the NP is dominated by the deeply dissected Hacking River valley, while the northern edge of the park is bordered by the Port Hacking estuary. Partly as a consequence of the diverse topographical features, Royal NP supports one of the most floristically diverse areas for its size in the temperate regions of the world (NSW National Parks and Wildlife Service 2000b). Of particular note are areas of subtropical, warm temperate and littoral rainforests. These rainforest patches represent the northernmost extent of the once extensive rainforests of the Illawarra region (NSW National Parks and Wildlife Service 2000b). However, continuous habitat linking these rainforest remnants to the Illawarra are potentially threatened by development (refer to Upper Hacking site). Other important vegetation communities include extensive heathlands, estuarine wetlands fringing Port Hacking, upland swamps in poorly drained headwater valleys, such as Uloola Swamp, and freshwater lagoons behind Jibbon and Marley Beaches. The site is heavily visited by the public and includes a number of settlements primarily built between the 1930s and 1950s comprising shacks along sections of the coast in the southern end of the Park. In recent times the site has been subject to frequent and intense wildfires, potentially resulting in the loss or increased rarity of a number of species (NSW National Parks and Wildlife Service 2001e; Andrew 2001; Tulloch 2003). A number of high usage

public sealed roads within the site result in comparatively high levels of road mortality of fauna (Ramp *et al.* 2006; Schulz and Madden, DECC, unpublished survey results 2007), including threatened species such as the Eastern Pygmy-possum and Grey-headed Flying fox (Schulz and Madden, DECC, unpublished survey results 2007). There is a network of walking tracks across the area, with bush camping allowed in a number of localities. Rusa Deer were introduced in 1906 and the population has increased since the 1980s resulting in a significant impact on the vegetation through browsing, trampling, the curtailment of seed production and seedling recruitment (DEC 2004; Keith & Pellow 2005). The site supports five priority fauna habitats: forested wetland, rainforest, heathland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Low

Fauna Overview: Supports the most diverse assemblage of fauna in the CMA, including the largest number of threatened species and amongst the highest number of regionally significant species recorded in any site.



A number of pairs of the regionally significant White-bellied Sea-Eagle nest within the Park. M. Schulz



Royal NP is a stronghold for the threatened Red-crowned Toadlet. M. Schulz



Unusual animals occasionally turn up on the beaches of the Park, such as the Leopard Seal. M. Schulz

Priority Fauna Species Review:

There have been 331 vertebrate fauna species (excluding escapees, marine species, unconfirmed species and single unsubstantiated records of species outside well outside their normal range, and fish species) documented within this area in the last 10 years: 232 birds, 41 reptiles, 40 mammals and 18 frogs. Of these four species are considered endangered (excluding vagrants and unconfirmed species), 21 species as vulnerable and one endangered ecological fauna community occurs (discussed below). A further 100 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Scattered records in a variety of habitats (Atlas of NSW Wildlife records).
**Stuttering Frog	Endangered	1995 (Andrew 2001)	Crown: DECC	Status uncertain, with no recent targeted surveys undertaken since 1996 in Bola and Cawleys Creeks. Tadpoles collected in Cawleys Creek were confirmed to be of this species (Andrew 2001).
Red-crowned Toadlet	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	One of the strongholds of this species within the CMA. Widespread in minor drainage lines and depressions associated with a variety of vegetation

Species	Threat Category*	Last Recorded	Tenure	Comments
				associations (Andrew 2001; Atlas of NSW Wildlife records).
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: DECC	One recent record from Jibbon Lagoon in Apr 2003 (Atlas of NSW Wildlife record). Current status in the area is unknown; not listed as a current locality in the draft recovery plan for the species (DEC 2005b).
Rosenberg's Goanna	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Scattered records within a variety of heath dominated habitats (e.g. Atlas of NSW Wildlife records). Occasionally roadkilled within the site (M. Schulz, DECC, unpublished records).
Broad-headed Snake	Endangered	1998 (Atlas record)	Crown: DECC	Status uncertain. Scattered records (e.g. Atlas of NSW Wildlife records). Occasionally roadkilled within the site.
Freckled Duck	Vulnerable	2003 (Anyon-Smith 2006)	Crown: DECC	Rare drought visitor; the most recent record of two birds at Marley Lagoon (Anyon-Smith 2006).
**Black Bittern	Vulnerable	Uncertain (Anyon-Smith 2006)	Crown: DECC	Vagrant to estuarine situations with no recent records (Andrew 2001; Anyon-Smith 2006).
Osprey	Vulnerable	2007 (Birdline NSW records)	Crown: DECC	Occasional records from along the shoreline, particularly in Port Hacking (Anyon-Smith 2006).
Square-tailed Kite	Vulnerable	2003 (Anyon-Smith 2006)	Crown: DECC	Rare visitor to a variety of habitats (Anyon-Smith 2006).
**Bush Stone-curlew	Endangered	1938 (Anyon-Smith 2006)	Crown: DECC	Last record in 1938 from Gundamaian, now locally extinct (Hoskin 1971; Anyon-Smith 2006).
Beach Stone-curlew (VAGRANT)	Endangered	1999 (Anyon-Smith 2006)	Crown: DECC	Vagrant, seen at Bonnie Vale and Era Beaches (Anyon-Smith 2006).
Pied Oystercatcher	Vulnerable	2007(M. Schulz, DECC, unpublished records)	Crown: DECC	Uncommon resident present in small numbers, predominantly in the Bonnie Vale area. Has been recorded breeding (Anyon-Smith 2006).
Sooty Oystercatcher	Vulnerable	2007(M. Schulz, DECC, unpublished records)	Crown: DECC	Regular visitor in small numbers on coastal rock platforms, particularly between Jibbon and Shelly Beaches and in the Era Beach area (M. Schulz, DECC, unpublished records).
Shorebird community ¹	Endangered Ecological Community	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Status uncertain. The lack of high tide roosts in Port Hacking suggests that some individuals from this endangered community fly south from Botany Bay at low tide to forage on exposed intertidal flats in the Bonnie Vale area, Port Hacking (refer also to Port Hacking site).
Little Tern	Endangered	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Occasionally recorded along the Port Hacking foreshore, around Jibbon Headland and foraging close inshore elsewhere along the coast, such as Garie Beach (Anyon-Smith 2006; M. Schulz, DECC, unpublished records).
Superb Fruit-Dove (VAGRANT)	Vulnerable	2007 (Birdline NSW)	Crown: DECC	In recent decades a vagrant to the site (Anyon-Smith 2006).
**Rose-crowned Fruit-Dove	Vulnerable	Uncertain (Anyon-Smith)	Crown: DECC	Vagrant, with no recent records (Anyon-Smith 2006).

Species	Threat Category*	Last Recorded	Tenure	Comments
(VAGRANT)		2006)		
Glossy Black-Cockatoo	Vulnerable	2002 (Atlas record)	Crown: DECC	A rare visitor to the site (Anyon-Smith 2006).
Gang-gang Cockatoo	Vulnerable	2002 (Atlas record)	Crown: DECC	Rare visitor in a variety of forested habitats (Anyon-Smith 2006).
Swift Parrot	Endangered	2002 (Anyon-Smith 2006)	Crown: DECC	Rare visitor, mainly when Bangalay <i>Eucalyptus botryoides</i> and Swamp Mahogany <i>E. robusta</i> are in flower, such as behind Burning Palms Beach in Aug 2002 (Anyon-Smith 2006).
**Eastern Ground Parrot	Vulnerable	1960 (Hoskin 1971)	Crown: DECC	Locally extinct. Most recent record from between Flat Rock Creek crossing and Wattamolla turnoff in 1960 (Hoskin 1971). Unconfirmed recent records in Curra Moors area. Dusk surveys in treeless heathlands in various parts of the site during 2007 have failed to detect any calling birds (Current study). Note that to an inexperienced observer this species can readily be confused with some calls of the Tawny-crowned Honeyeater.
Powerful Owl	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Scattered pairs occur within the site, particularly along the Hacking River valley and in the Cabbage Tree Creek area 2007 (M. Schulz, DECC, unpublished records; R. Jackson, pers. comm.).
**Barking Owl (VAGRANT)	Vulnerable	1975 (Hoskin 1971)	Crown: DECC	Vagrant, with no records in the last 10 years (Anyon-Smith 2006).
Sooty Owl	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Rare resident, with up to six pairs thought to be present (Andrew 2001; Anyon-Smith 2006). One radio-tagged individual that roosted near Audley regularly flew west to the Woronora River and fed along the northern shoreline of Port Hacking (Jackson & Kavanagh 1997; Kavanagh & Jackson 1997). There have been several studies of the diet of this owl within the Park (Kavanagh & Jackson 1997; Bilney <i>et al.</i> 2007).
Masked Owl	Vulnerable	2007 (Atlas record)	Crown: DECC	Status uncertain. Occasional sightings in a variety of habitats (e.g. Anyon-Smith 2006).
**Eastern Bristlebird	Endangered	Uncertain (Anyon-Smith 2006)	Crown: DECC	Locally extinct. Unconfirmed recent records, such as in the Curra Moors area (Anyon-Smith 2006).
**Speckled Warbler	Vulnerable	Uncertain (Anyon-Smith 2006)	Crown: DECC	Once occurred in the north-western corner of the NP; now locally extinct (Hoskin 1971; Anyon-Smith 2006).
**Regent Honeyeater	Endangered	Uncertain (Anyon-Smith 2006)	Crown: DECC	Rare visitor with no recent records (Hoskin 1971; Anyon-Smith 2006).
**Black-chinned Honeyeater (VAGRANT)	Vulnerable	Uncertain (Anyon-Smith 2006)	Crown: DECC	Vagrant with one old record between Waterfall and Moola Creeks (Hoskin 1971; Anyon-Smith 2006).
**Painted Honeyeater (VAGRANT)	Vulnerable	1924 (Anyon-Smith 2006)	Crown: DECC	Vagrant with no recent records (Anyon-Smith 2006).
Diamond Firetail	Vulnerable	2002 (Anyon-Smith 2006)	Crown: DECC	Rare visitor (Hoskin 1971; Anyon-Smith 2006).

Species	Threat Category*	Last Recorded	Tenure	Comments
**Spotted-tailed Quoll	Vulnerable	Uncertain (Andrew 2001)	Crown: DECC	Status uncertain. No recent confirmed records (e.g. Andrew 2001; Atlas of NSW Wildlife records).
Koala	Vulnerable	2005 (Atlas record)	Crown: DECC	Status uncertain. Scattered records, such as from the Waterfall area (Atlas of NSW Wildlife records).
Eastern Pygmy-possum	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Pitfall trapping results suggest that this species is moderately common and widely distributed within the site (Andrew 2001; Tulloch 2003). Not recorded as a roadkilled species by Ramp <i>et al.</i> (2006) probably because these studies were undertaken during the day. Between June and early Sept 2007 eight individuals have been found in approx. 1200 km travelled at night with no individuals found dead during the day (M. Schulz & K. Madden, DECC, unpublished records). Additionally a minimum of seven live individuals have been seen crossing the road at various localities at night during the same time period.
Grey-headed Flying-fox	Vulnerable	2007 (M. Schulz, DECC, unpublished records)	Crown: DECC	Forages widely across the site in a variety of habitats when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.). However, it is likely that a roost is present as individuals have been seen flying to flowering trees from a direction where no known camp has been recorded (Current study). Occasionally roadkilled (Ramp <i>et al.</i> 2006; M. Schulz & K. Madden, DECC, unpublished records).
**Yellow-bellied Sheathail-bat (VAGRANT)	Vulnerable	Uncertain (Andrew 2001)	Crown: DECC	Status uncertain. No recent records (Atlas of NSW Wildlife records; Australian Museum records). This species is regarded as a vagrant to the CMA, with occasional dead or sick individuals found (DECC 2007b; H. Parnaby, DECC, pers. comm.).
Large-eared Pied Bat	Vulnerable	2000 (Atlas record)	Crown: DECC	Principally recorded from the Hacking River valley and forested sites on higher fertility soils, such as the Garawarra Ridge Track (Andrew 2001; Parnaby 2001; Atlas of NSW Wildlife records).
Eastern Bentwing-bat	Vulnerable	2000 (Atlas record)	Crown: DECC	Principally recorded from the Hacking River valley (Parnaby 2001; Atlas of NSW Wildlife records). No documented roosts within the site.
Southern Myotis	Vulnerable	1999 (Atlas record)	Crown: DECC	Recorded from along the Hacking River (Andrew 2001; Parnaby 2001; Atlas of NSW Wildlife records). No documented roosts within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	2000 (Atlas record)	Crown: DECC	Scattered records from higher fertility forested habitats (Atlas of NSW Wildlife record). The

Species	Threat Category*	Last Recorded	Tenure	Comments
				ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).
Greater Broad-nosed Bat	Vulnerable	2000 (Atlas record)	Crown: DECC	Status uncertain. One recent record from along the Hacking River (Parnaby 2001). Likely to be more common and widespread than the paucity of records suggest.

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points NSW Scientific Committee (1998).

Additional Faunal Values: Maternity cave of the regionally significant Eastern Horseshoe-bat; tidal shoreline on Port Hacking and along ocean beaches occasionally used by small numbers of migratory shorebirds; the Pied Oystercatcher has been recorded nesting in the site (Anyon-Smith 2006).

Identified Threats to Fauna Values:

High: Impacts of high intensity fire; water quality of the major watercourses from high usage areas and activities in headwaters outside the Park; impacts of high public visitation, including road mortality and disturbance by jet skis and boats along the Port Hacking shoreline; removal of hollow-bearing trees particularly adjacent to visitor facilities along the Hacking River; impacts of the introduced Rusa Deer; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands; impacts associated with the spread of the Root-rot Fungus *Phytophthora cinnamomi*.

Moderate: Erosion; impacts of shack areas within the NP; disturbance by uncontrolled domestic dogs; weed infestation; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; the illegal collection of reptiles, particularly the Broad-headed Snake; entanglement in discarded fishing tackle.



The Eastern Pygmy-possum is regularly killed at night on public roads within the site. M. Schulz



Shacks on sections of the coast may impact on local faunal values. M. Schulz



The feral Rusa Deer impacts the NP by browsing on vegetation, trampling fragile ecosystems and affecting seed regeneration. D. Andrew

Land Management:

This site is primarily Royal NP managed by DECC.

References and Further Reading:

Andrew (2001), Anyon-Smith (2006), Bilney *et al.* (2007), Chafer & Andersen (1994), DEC (2004), DECC (2007a, b), Hoskin (1971), Jackson & Kavanagh (1997), Kavanagh & Jackson (1997), Keith (2004), Keith & Pellow (2005), Morrissey (2003), NSW National Parks and Wildlife Service (2000,

2000b, 2001e, 2002b, 2001c, e), NSW Scientific Committee (1998), Parnaby (2001), Pennay *et al.* (2004), Ramp *et al.* (2006), Tulloch (2003), Whelan *et al.* (1996).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Atlas of NSW Wildlife; +2 – Anyon-Smith (2006); +3 – Andrew (2001); +4 – M. Schulz, DECC, unpublished records; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife); *2 – only recorded prior to 1997 (Andrew 2001); *3 – only recorded prior to 1997 (Hoskin 1971).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+1	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Stuttering Frog <i>Mixophyes balbus</i>	*2	E1	
Haswell's Froglet <i>Paracrinia haswelli</i>	+1	P	RS
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+1	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	*1	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+1	E1	
Green Tree Frog <i>Litoria caerulea</i>	*2	P	RS
Blue Mountains Tree Frog <i>Litoria citropa</i>	+1	P	
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Freycinet's Frog <i>Litoria freycineti</i>	+1	P	RS
Jervis Bay Tree Frog <i>Litoria jervisiensis</i>	+1	P	
Broad-palmed Frog <i>Litoria latopalmata</i>	+1	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+3	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+1	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+1	P	
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+1	P	RS
Burton's Legless-lizard <i>Lialis burtonis</i>	+1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*1	P	RS
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+1	P	RS
Eastern Brown Tree Snake <i>Boiga irregularis</i>	+1	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+1	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+1	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+1	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Red-naped Snake <i>Furina diadema</i>	+3	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+1	E1	
Mainland Tiger Snake <i>Notechis scutatus</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+1	P	RS
Birds:			
Australian Brush-turkey <i>Alectura lathamii</i>	+2	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
King Quail <i>Coturnix chinensis</i>	+2	P	RS
Common Pheasant <i>Phasianus colchicus</i>	*2	U	Failed Introduction
Plumed Whistling-Duck <i>Dendrocygna eytoni</i>	*2	P	
Musk Duck <i>Biziura lobata</i>	+1	P	RS
Freckled Duck <i>Stictonetta naevosa</i>	+1	V	
Black Swan <i>Cygnus atratus</i>	+1	P	
Mute Swan <i>Cygnus olor</i>	*3	U	Bred in 1950s
Australian Shelduck <i>Tadorna tadornoides</i>	*2	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	*2	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
White-necked Heron <i>Ardea pacifica</i>	+1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+1	P	
Cattle Egret <i>Ardea ibis</i>	+2	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	+1	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	*2	V	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+1	P	
Osprey <i>Pandion haliaetus</i>	+1	V	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Square-tailed Kite <i>Lophoictinia isura</i>	+2	V	
Black Kite <i>Milvus migrans</i>	*2	P	
Whistling Kite <i>Haliastur sphenurus</i>	+1	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Spotted Harrier <i>Circus assimilis</i>	+1	P	
Swamp Harrier <i>Circus approximans</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+1	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+1	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Brown Falcon <i>Falco berigora</i>	+1	P	
Australian Hobby <i>Falco longipennis</i>	+1	P	
Black Falcon <i>Falco subniger</i>	+2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+1	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+1	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	+1	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Whimbrel <i>Numenius phaeopus</i>	+1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+1	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+1	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+1	P	RS
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+1	P	RS
Bush Stone-curlew <i>Burhinus grallarius</i>	*2	E1	Locally Extinct
Beach Stone-curlew <i>Esacus neglectus</i>	+2	E1	
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	+1	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+1	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	+1	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Black-fronted Dotterel <i>Elsayornis melanops</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+1	P	
Kelp Gull <i>Larus dominicanus</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	+1	P	
Common Tern <i>Sterna hirundo</i>	+1	P	RS
Little Tern <i>Sterna albifrons</i>	+1	E1	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+1	P	RS
Emerald Dove <i>Chalcophaps indica</i>	+1	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	+1	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*2	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+4	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+1	P	RS
Superb Fruit-Dove <i>Ptilinopus superbus</i>	+2	V	
Rose-crowned Fruit-Dove <i>Ptilinopus regina</i>	*2	V	
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+1	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+1	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+1	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+2	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Eastern Ground Parrot <i>Pezoporus wallicus wallicus</i>	*2	V	Locally extinct?
Oriental Cuckoo <i>Cuculus saturatus</i>	*2	P	RS
Pallid Cuckoo <i>Cuculus pallidus</i>	+1	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Black-eared Cuckoo <i>Chrysococcyx osculans</i>	+2	P	RS
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamis orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+1	P	RS
Powerful Owl <i>Ninox strenua</i>	+1	V	
Barking Owl <i>Ninox connivens</i>	*2	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Sooty Owl <i>Tyto tenebricosa</i>	+1	V	
Masked Owl <i>Tyto novaehollandiae</i>	+1	V	
Barn Owl <i>Tyto alba</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+1	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Fork-tailed Swift <i>Apus pacificus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Forest Kingfisher <i>Todiramphus macleayii</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Noisy Pitta <i>Pitta versicolor</i>	*2	P	RS
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Red-browed Treecreeper <i>Climacteris erythroptis</i>	+1	P	RS
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Eastern Bristlebird <i>Dasyornis brachypterus</i>	*2	E1	Locally extinct
Pilotbird <i>Pycnoptilus floccosus</i>	+1	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
Yellow-throated Scrubwren <i>Sericornis citreogularis</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	+1	P	RS
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+1	P	RS
Speckled Warbler <i>Chthonicola sagittata</i>	*2	V	Locally extinct
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
Mangrove Gerygone <i>Gerygone levigaster</i>	+2	P	RS
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Spiny-cheeked Honeyeater <i>Acanthagenys rufogularis</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Little Friarbird <i>Philemon citreogularis</i>	*2	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*2	E1	
Blue-faced Honeyeater <i>Entomyzon cyanotis</i>	*2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
Black-chinned Honeyeater <i>Melithreptus gularis</i>	*2	V	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+2	P	RS
Painted Honeyeater <i>Grantiella picta</i>	*2	V	
Crescent Honeyeater <i>Phylidonyris pyrrhoptera</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+2	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Black Honeyeater <i>Certhionyx niger</i>	*2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Jacky Winter <i>Microeca fascians</i>	*2	P	Locally extinct

Species	Status	Legal Status	Regional Status
Scarlet Robin <i>Petroica boodang</i>	+1	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Logrunner <i>Orthonyx temminckii</i>	+1	P	RS
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinlosoma punctatum</i>	+1	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Spectacled Monarch <i>Monarcha trivirgatus</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+1	P	
Restless Flycatcher <i>Myiagra inquieta</i>	*2	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*2	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+1	P	
White-winged Triller <i>Lalage tricolor</i>	*2	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+2	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	*2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Torresian Crow <i>Corvus orru</i>	*2	P	
Apostlebird <i>Struthidea cinerea</i>	*2	P	
Green Catbird <i>Ailuroedus crassirostris</i>	+1	P	RS
Regent Bowerbird <i>Sericulus chrysocephalus</i>	*1	P	Locally extinct
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
Eurasian Skylark <i>Alauda arvensis</i>	+1	U	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Diamond Firetail <i>Stagonopleura guttata</i>	+1	V	

Species	Status	Legal Status	Regional Status
Beautiful Firetail <i>Stagonopleura bella</i>	+1	P	RS
Nutmeg Mannikin <i>Lonchura punctulata</i>	+1	U	
European Goldfinch <i>Carduelis carduelis</i>	+3	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	*2	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	*2	P	RS
Brown Songlark <i>Cincloramphus cruralis</i>	*2	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+1	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Platypus <i>Ornithorhynchus anatinus</i>	+1	P	Unconfirmed
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	*2	V	
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Dusky Antechinus <i>Antechinus swainsonii</i>	*2	P	RS
Common Dunnart <i>Sminthopsis murina</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Koala <i>Phascolarctos cinereus</i>	+1	V	
Common Wombat <i>Vombatus ursinus</i>	+1	P	RS
Mountain Brushtail Possum <i>Trichosurus caninus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+1	V	
Feathertail Glider <i>Acrobates pygmaeus</i>	+1	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Greater Glider <i>Petauroides volans</i>	+1	P	RS, Extinct?
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Red-necked Wallaby <i>Macropus rufogriseus</i>	*2	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Red-necked Pademelon <i>Thylogale thetis</i>	*2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Horseshoe-bat <i>Rhinolophus megaphyllus</i>	+1	P	RS
Yellow-bellied Sheathtail-bat <i>Saccolaimus flaviventris</i>	*2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+4	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+1	P	
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	+1	V	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+1	V	Unconfirmed
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+1	V	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
Water-rat <i>Hydromys chrysogaster</i>	+1	P	RS
House Mouse <i>Mus musculus</i>	+1	U	
New Holland Mouse <i>Pseudomys novaehollandiae</i>	+1	P	RS
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Bush Rat <i>Rattus fuscipes</i>	+1	P	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Feral Pig <i>Sus scrofa</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	
Fallow Deer <i>Dama dama</i>	+1	U	

Site 2: TOWRA POINT

Location:

The southern shore of Botany Bay from Bonna Point, Kurnell west to Taren Point, including Towra Point NR and sections of the Towra Point Aquatic Reserve (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	463	42
Crown Land	1	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other (including land managed by NSW DPI Fisheries)	635	58
Total	1099	100

Environmental Setting:



Towra Spit Island, an important site for nesting Little Terns and roosting shorebirds. M Schulz/DECC



This site supports the largest coastal saltmarsh area within the CMA. M. Schulz/DECC



Mangroves are an important habitat within the site for species such as the Mangrove Gerygone. M. Schulz/DECC

The site comprises an icon wetland that is listed under the Ramsar Convention on Wetlands of International Importance. The Towra Point wetlands are the largest and most diverse estuarine wetland complex remaining in the CMA (NSW National Parks and Wildlife Service 2001f). The adjoining Towra Point Aquatic Reserve includes much of the remaining important seagrass, mangrove and migratory shorebird habitats in Botany Bay (NSW National Parks and Wildlife Service 2001f). Adjacent intertidal and wetland areas west of Shell Point (e.g. Woodlands Bay) have been included in the site as these are functionally part of the Towra Point ecosystem and are considered important in the strategic plan for the Towra Point wetlands (D. Andrew, DECC, pers. comm.).

Towra Point comprises alluvial and marine Quaternary marine sediments, with sand deposits behind the southern shore of Quibray Bay comprising Quaternary windblown and marine sands. Important vegetation communities contributing to the significance of the site include: a) tidal mudflats and exposed seagrass beds comprising Strapweed *Posidonia australis* and Eelgrass *Zostera capricornii*, which are important foraging areas for migratory shorebirds and other waterbirds, such as at Shell Point, Pelican Point, Quibray Bay and near Fish Creek; b) mangrove communities, which total over 50% of this habitat within the CMA; c) saltmarshes (listed as an endangered ecological community under the TSC Act 1995) which represent the only substantial areas of this habitat within the CMA; and d) freshwater wetlands (listed under the TSC Act 1995 as an endangered ecological community), including small ephemeral pools, reed and cumbungi (*Typha* sp) swamps that support a number of endangered and vulnerable species such as the Green and Golden Bell Frog. Additionally, adjacent terrestrial vegetation communities include a number of endangered ecological communities listed under the TSC Act (1995), such as Kurnell Dune Forest, Littoral Rainforest in the Sydney Basin and Swamp Oak Floodplain Forest (NSW National Parks and Wildlife Service 2001g). Extensive areas of these terrestrial communities are infested with weeds, such as Bitou Bush *Chrysanthemoides monilifera*, Lantana *Lantana camara* and Asparagus Fern *Asparagus sprengeri*.

Much of the terrestrial vegetation is regenerating after past clearing activities. The site is tenuously linked by continuous vegetation across private land or crown land that is currently being developed (e.g. the Kurnell desalination plant) to Botany Bay NP (refer to Kurnell site). The site supports four priority fauna habitats: forested wetland, rainforest, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports important habitat for migratory shorebirds (including threatened species such as the Terek Sandpiper), other waterbirds, nesting habitat for the endangered Little Tern and vulnerable Pied Oystercatcher; the Mangrove Gerygone and Brown Honeyeater reach their southern range limit in NSW in this site; and a range of other fauna in adjacent saltmarsh and bushland that are highly restricted within the CMA including the endangered Green and Golden Bell Frog, the vulnerable Masked Owl and one of only two remaining populations of the White-fronted Chat in the region.



The endangered Little Tern regularly nests on Towra Spit Island. Botany Bay NP/DECC



The Bar-tailed Godwit is an important component of the endangered shorebird community listed for the area. M. Schulz



A number of species well represented within this site are rare elsewhere within the CMA, such as the Brown Honeyeater. M. Schulz

Priority Fauna Species Review:

There have been 175 vertebrate fauna species (excluding fish, marine species, vagrants and escapees) documented within this area in the last 10 years: 140 birds, 17 mammals, 12 reptiles and six frogs. Of these two are considered endangered (excluding vagrants), nine as vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further 43 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: DECC	Current status uncertain. This site supports part of the Kurnell key population of the species which is the second largest population in the CMA (DECC 2007). Recorded from a number of freshwater/brackish lagoons in the area, such as Towra Lagoon (Atlas of NSW Wildlife records). Also known from areas immediately adjacent to the southern boundary of the site, such as adjacent to Captain Cook Drive (Atlas of NSW Wildlife records). Populations within the site have been impacted by saltwater intrusion into Towra Lagoon

Species	Threat Category*	Last Recorded	Tenure	Comments
				and may in the future be impacted by nutrients and other pollutants leaching into the Kurnell aquifer from adjacent industrial and landfill sites on the Kurnell Peninsula (DECC 2007).
Australasian Bittern	Vulnerable	2006 (Atlas record)	Crown: DECC	Status uncertain. Occasional individuals recorded from the Woollooware Shorebird Lagoon (e.g. Atlas of NSW Wildlife records). Likely to also occur in wetlands and extensive sedgelands between the interface of the coastal saltmarsh and terrestrial vegetation communities, particularly on Towra Point and in the south-eastern section of Woollooware Bay.
Black-tailed Godwit	Vulnerable	2007 (Morris 2007)	Crown: DECC, DPI Fisheries	Rare visitor. One individual recorded in Quibray Bay in Mar 2007 (Morris 2007).
Terek Sandpiper	Vulnerable	2004 (NSW Wader Study Group counts data)	Crown: DECC, DPI Fisheries	Uncommon and declining species. Small numbers irregularly observed in the site, principally roosting on the barges and other derelict infrastructure in the Shell Point area of Woollooware Bay (NSW Wader Study Group count data).
Great Knot	Vulnerable	2004 (NSW Wader Study Group count data)	Crown: DECC, DPI Fisheries	Uncommon species. Small numbers observed in the site, principally on Towra Spit Island (D. Andrew, DECC, pers. comm.).
**Broad-billed Sandpiper	Vulnerable	1991 (Atlas record)	Crown: DECC, DPI Fisheries	Declining shorebird in the site, with no recent documented records. A number of early records from the Shell Point area (Atlas of NSW Wildlife records).
**Australian Painted Snipe (VAGRANT)	Endangered	Undated (Hoskin <i>et al.</i> 1991)	Uncertain	Record listed for the site by Hoskin <i>et al.</i> (1991).
**Bush Stone-curlew	Endangered	2001 (Morris 2001)	Crown: DECC	Locally extinct.
Beach Stone-curlew (VAGRANT)	Endangered	2004 (Jones 2004)	Crown: DECC, DPI Fisheries	Vagrant. A single bird recorded from the site in Dec 2001 (Morris 2001).
Pied Oystercatcher	Vulnerable	2007 (Current study)	Crown: DECC, DPI Fisheries	Widespread along the shoreline, with roosting concentrations occurring on Towra Spit Island and on an old jetty in the Shell Point area. Numbers in the site peak during the non-breeding season between mid-autumn and mid-winter, with a maximum of 71 individuals recorded roosting in the latter locality in Apr 2005 (NSW Wader Study Group count data). Recorded nesting on Towra Spit Island, Towra Beach and Woollooware Shorebird Lagoon (S. Callaghan, DECC, pers. comm.; G. Ross, DECC, pers. comm.; D. Andrew, DECC, pers. comm.).
Sooty Oystercatcher	Vulnerable	2006 (NSW Wader Study Group count data)	Crown: DECC, DPI Fisheries	Occasional visitor in very small numbers.

Species	Threat Category*	Last Recorded	Tenure	Comments
**Lesser Sand Plover	Vulnerable	1971 (Atlas record)	Crown: DECC, DPI Fisheries	Declining shorebird in the site, with no recent documented records.
**Greater Sand Plover	Vulnerable	1987 (Atlas record)	Crown: DECC, DPI Fisheries	Declining shorebird in the site, with no recent documented records.
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown: DECC, DPI Fisheries	This community (i.e. 20 shorebird species) is identified as using the relict marginal shoal of the Georges River between Taren and Shell Points in Botany Bay (NSW Scientific Committee 1998). However, individuals from this community use the entire shoreline within the site for foraging and roost primarily on Towra Spit Island, old oyster lease posts in the Quibray Bay area, mangroves in various localities (such as Stinkpot Bay) and old jetties, barges and other infrastructure in the Shell Point area. The importance of the saltmarsh areas as roosting sites within the site is poorly known. The loss of old jetties, barges and oyster lease posts within the site may have a detrimental impact on some species within this community (D. Andrew, DECC, pers. comm.).
Little Tern	Endangered	2007 (Current study)	Crown: DECC, DPI Fisheries	Regularly nests on Towra Spit Island after relocation from Sydney Airport due to the construction of the third runway (Priddel & Ross 1996). This site is the most important locality for this endangered species in the CMA. Breeding productivity has been assisted by intensive on-ground management including the redistribution of sand to reduce exposure to tidal flooding using light engineering techniques; weed removal, management of encroaching vegetation; a warden program to reduce human disturbance (in some years); and Fox, Black Rat and ant baiting programs (e.g. Priddel & Ross 1996; Ross & Jarman 2001; Ross <i>et al.</i> 2003). Commonly forage in shallow inshore waters over seagrass beds in Towra Point Aquatic Reserve and occasionally roost on Towra Beach and the old oyster lease posts in Quibray Bay.
Masked Owl	Vulnerable	2006 (Schulz 2006)	Crown: DECC	Status uncertain. One bird responded to playback on a number of nights in Bangalay <i>Eucalyptus botryoides</i> open forest, littoral rainforest and Kurnell Dune Forest on Towra Point in May 2006 (Schulz 2006). At this time there were a large number of Black Rats present in the area.
**Striated Fieldwren	Vulnerable	1979 (Morris 2002)	Crown: DECC	Status uncertain with no recent confirmed records despite targeted searching for the species (e.g. Schulz 2006).
Grey-headed Flying-fox	Vulnerable	2006 (Schulz 2006)	Widespread in all terrestrial	This site is an important foraging locality for the nearby seasonally occupied camp in the desalination plant site (refer to

Species	Threat Category*	Last Recorded	Tenure	Comments
			vegetation communities	Kurnell site). In May 2006 regularly observed foraging in Coast Banksias <i>Banksia integrifolia</i> and on the fruits of various species in littoral rainforest on Towra Point and the north side of Captain Cook Drive.
Greater Broad-nosed Bat	Vulnerable	2006 (Schulz 2006)	Crown: DECC	Status uncertain. One individual trapped in Bangalay open forest on Towra Point in May 2006 (Schulz 2006).

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: The site is listed under the Ramsar Convention on Wetlands of International Importance as it meets the following criteria: a) it is a particularly good representative example of a natural or near natural wetland, and is characteristic of the bioregion; b) it supports an assemblage of rare, vulnerable or endangered plant or animal species, or an appreciable number of individuals of any one or more of those species; c) it is of value for maintaining the genetic and ecological diversity of the region, because of the quality and peculiarity of its flora and fauna; d) it regularly supports substantial numbers of individuals from particular groups of waterfowl; and e) it regularly supports 1% of individuals in a population of a species or subspecies of waterfowl (NSW National Parks and Wildlife Service 2001f).

Additionally: Little Terns regularly nest on Towra Spit Island; major migratory shorebird roosting and feeding area; three shorebird nesting sites: Towra Spit Island: Pied Oystercatcher and Red-capped Plover; Towra Point Beach: Pied Oystercatcher and Red-capped Plover; and Woollooware Shorebird Lagoon: Pied Oystercatcher. **Note:** There are old records of the Pied and Little Pied Cormorant nesting in small numbers in mangroves in Weeney and Woollooware Bays (Hoskin *et al.* 1991).

Identified Threats to Fauna Values:

High: Coastal habitat loss and alteration through altered coastal processes associated with major developments along the shores of Botany Bay (such as the loss of seagrass beds and increased active erosion of Towra Spit Island and Towra Point); seawater quality resulting in the loss of seagrass habitat; groundwater quality due to nutrients and other pollutants leaching into the Kurnell aquifer from adjacent industrial and landfill sites on the Kurnell Peninsula; disturbance, particularly outside the Towra Point NR, due to high public visitation (especially from boats, jet skis and hovercraft in tidal areas, and by horses in some foreshore areas especially in the vicinity of nesting and roosting sites); weed infestation (particularly Bitou Bush, Lantana and Asparagus Fern); predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); loss of continuous vegetation link to Botany Bay NP; predation on Little Tern and Pied Oystercatcher nests by the presence of unnaturally high Silver Gull and Australian Raven populations which have increased in response to the availability of food from human sources; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; loss of pylons and other old infrastructure used by threatened shorebirds for high-tide roosting; introduction of foreign organisms by shipping that may impact on the faunal values of the site, such as the algae *Calerpa scalpelliformis*; damage as a result of an oil spill from the Caltex Oil Refinery loading facility at Kurnell; climate change (i.e. a rise in sea level and increase in intense storm events will dramatically alter the characteristics of this site and therefore its fauna values).

Moderate: Disturbance by uncontrolled domestic dogs; impacts of fire; entanglement in discarded fishing tackle.



The tiny Little Tern chicks are vulnerable to predation from feral predators, Silver Gulls and Australian Ravens. Botany Bay NP



Shorebirds such as the Ruddy Turnstones require co-management with other areas for effective management. M. Schulz



Old jetties, barges and old oyster lease posts are important as roosts for the endangered shorebird community. M. Schulz/DECC

Land Management:

This site primarily comprises Towra Point NR managed by DECC and Towra Point Aquatic Reserve managed by NSW DPI Fisheries; with sections of crown land in the intertidal zone between Shell and Taren Points. Any work in relation to shorebirds forming the Endangered Ecological Shorebird community occurring on the relict tidal delta sands of Botany Bay (listed under the TSC Act 1995) will require a cooperative approach to managing the site, in conjunction with other migratory shorebird/waterbird sites in the Botany Bay/lower Georges River area. Management is perhaps best served by the development of an overall plan of management.

References and Further Reading:

Australian Littoral Society (1977), Biosis Research (2002), Connell Wagner (2001), Dames and Moore (1996), DEC (2005b), DECC (2007), Geering *et al.* (2007), Hoskin *et al.* (1991), Keith (2004), Morris (2001, 2002, 2007), NSW National Parks and Wildlife Service (2001c, f, g), NSW Scientific Committee (1998), Priddel & Ross (1996), Ross & Jarman (2001), Ross *et al.* (2003), Schulz (2006), Smith (1990, 1991), Sutherland Shire (2000).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1– Atlas of NSW Wildlife; +2 – Records from various observers posted on the Birding-aus website; +3 – additional records from Schulz (2006); +4 – NSW Wader Study Group monthly counts; +5 – additional records from current survey; * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Priddel & Ross 1996); . *2 – only recorded prior to 1997 (Hoskin *et al.* 1991)

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+5	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+1	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Jervis Bay Tree Frog <i>Litoria jervisiensis</i>	+3	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Golden-crowned Snake <i>Cacophis squamulosus</i>	+1	P	RS
Yellow-faced Whipsnake <i>Demansia psammophis</i>	+1	P	
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Birds:			
Stubble Quail <i>Coturnix pectoralis</i>	*	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+5	P	RS
Musk Duck <i>Biziura lobata</i>	+1	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Shelduck <i>Tadorna tadornoides</i>	*	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchos</i>	*	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	*	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	*	P	RS
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	*	P	
Cattle Egret <i>Ardea ibis</i>	*	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australasian Bittern <i>Botaurus poiciloptilus</i>	+1	V	
Glossy Ibis <i>Plegadis falcinellus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	+1	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+1	P	RS
Wedge-tailed Eagle <i>Aquila audax</i>	*1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	*	P	RS
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+1	P	RS
Baillon's Crake <i>Porzana pusilla</i>	*	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	*	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	*	P	RS
Black-tailed Godwit <i>Limosa limosa</i>	+2	V	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Little Curlew <i>Numenius minutus</i>	*	P	
Whimbrel <i>Numenius phaeopus</i>	+1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+1	P	RS
Common Greenshank <i>Tringa nebularia</i>	+1	P	RS
Terek Sandpiper <i>Xenus cinereus</i>	+4	V	
Common Sandpiper <i>Actitis hypoleucos</i>	+1	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+1	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+1	P	RS
Great Knot <i>Calidris tenuirostris</i>	+4	V	
Red Knot <i>Calidris canutus</i>	+1	P	RS
Red-necked Stint <i>Calidris ruficollis</i>	+1	P	RS
Long-toed Stint <i>Calidris subminuta</i>	*2	P	
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+1	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	+1	P	RS
Broad-billed Sandpiper <i>Limicola falcinellus</i>	*	V	
Australian Painted Snipe <i>Rostratula benghalensis australis</i>	*2	E1	
Bush Stone-curlew <i>Burhinus grallarius</i>	*	E1	Locally Extinct
Beach Stone-curlew <i>Esacus neglectus</i>	+2	E1	
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	+2	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+4	P	RS
Grey Plover <i>Pluvialis squatarola</i>	+4	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	+1	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Lesser Sand Plover <i>Charadrius mongolus</i>	*	V	
Greater Sand Plover <i>Charadrius leschenaultii</i>	*	V	
Oriental Plover <i>Charadrius veredus</i>	*	P	
Black-fronted Dotterel <i>Elseyaornis melanops</i>	+1	P	
Red-kneed Dotterel <i>Erythrogonys cinctus</i>	*	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+2	P	
Kelp Gull <i>Larus dominicanus</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Common Tern <i>Sterna hirundo</i>	+1	P	RS
Arctic Tern <i>Sterna paradisaea</i>	*	P	
Little Tern <i>Sterna albifrons</i>	+1	E1	
Fairy Tern <i>Sterna nereis</i>	*2	P	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	*	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	*	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Blue-winged Parrot <i>Neophema chrysostoma</i>	*	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basal</i>	+5	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+5	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Masked Owl <i>Tyto novaehollandiae</i>	+1	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+5	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	*	P	RS
Striated Fieldwren <i>Calamanthus fuliginosus</i>	*	V	
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
Mangrove Gerygone <i>Gerygone levigaster</i>	+1	P	RS
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Spiny-cheeked Honeyeater <i>Acanthagenys rufogularis</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+1	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
White-fronted Chat <i>Epthianura albifrons</i>	+1	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	*	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
Citrine Wagtail <i>Motacilla citreola</i>	*2	P	
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	*	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	

Species	Status	Legal Status	Regional Status
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+5	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+1	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Black Rat <i>Rattus rattus</i>	+1	U	
Brown Rat <i>Rattus norvegicus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 3: DHARAWAL

Location:

Far southern section of the CMA in the headwaters of Georges River, including the O'Hares Creek catchment, centred on Dharawal SCArea, Dharawal NR, the O'Hares Creek Special Area and other crown land (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Campbelltown, Wollondilly and Wollongong

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	6731	69
Crown Land	2228	23
Commonwealth Land	17	0
Remaining Public Land	430	4
Other	385	4
Total	9791	100

Environmental Setting:



Extensive upland swamp on Maddens Plains
H. Jessup/DECC



Deep pool backed by towering rock outcrop
on O'Hares Creek. H. Jessup/DECC



Western gully forest on higher fertility soil
upslope from the Georges River, Dharawal
SCArea. M. Schulz/DECC

This large area is located on the southern boundary of the CMA in the headwaters of the Georges River. It extends from immediately west of the Illawarra Escarpment at Maddens Plains through to the Georges River and is bounded to the north by Holsworthy Military Reserve and the Woronora Special Area. This site is located within a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). It is located on the Woronora Plateau, an area dominated by Hawkesbury Sandstone, with deposits of swamp alluvium accumulated in low-relief headwater valleys along the eastern edge of the plateau. West of Lysaghts Road, residual shale soils mix with quartz sandstone of the Mittagong series to form a richer substrate (DEC 2006c). Vegetation is dominated by upland swamps, heath and fringing heath woodland, exposed sandstone woodlands, upper Georges River sandstone woodland, eastern gully forest, western gully forest and shale forest (Keith 1994; DEC 2006c; DECC 2007d). Much of the area is protected as conservation reserve and/or Sydney Catchment Authority Special Areas, with several coal mines either active (e.g. West Cliff Colliery) or discontinued (e.g. Northcliff Colliery) within the site. A large section of the area was extensively and intensively burnt by wildfire in 2001 (DEC 2006d). The site supports three priority fauna habitats: grassy woodland, heathland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Low

Fauna Overview: Supports a large diversity of fauna, many of which are limited in distribution within the CMA, including a number of species associated with upland swamps and heathlands, such as the threatened Littlejohn’s Tree Frog, Rosenberg’s Goanna and Eastern Pygmy-possum and species associated with higher fertility woodland, such as the Koala and Greater Broad-nosed Bat.



The Bold-striped Cool-skink is only known from this site within the CMA. N. Williams



There are a number of records of the Eastern Pygmy-possum, particularly from heathy habitat in the eastern part of the site. N. Williams



The Mountain Heath Dragon is restricted to larger habitat blocks within the south of the CMA. H. Jessup/DECC

Priority Fauna Species Review:

There have been 243 vertebrate fauna species (excluding fish and unconfirmed species) documented within this area in the last 10 years: 144 birds, 39 reptiles, 38 mammals and 22 frogs. Of these one species is considered endangered and 17 species (excluding unconfirmed species) as vulnerable (discussed below). A further 69 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea; possibly elsewhere	Scattered records in areas of deep sandy soil in upland swamps, heath and fringing heath woodlands and exposed sandstone woodlands, particularly between North Cliff Colliery and the Rifle Range (DECC 2007d).
**Stuttering Frog	Endangered	Early 1900s (Australian Museum record)	Uncertain	Precise locality unknown as the Australian Museum specimen was registered as ‘Darkes Forest’. May possibly have occurred in headwater streams within the site adjacent to Darkes Forest, such as Maddens Creek (G. Daly, fauna consultant, pers. comm.).
Red-crowned Toadlet	Vulnerable	2005 (Atlas record)	Crown: Dharawal SCArea; possibly elsewhere	Scattered records in minor drainage lines and depressions in upland swamps, heath and fringing heath woodlands, exposed sandstone woodlands and eastern gully forests (DECC 2007d). Status currently uncertain as none were recorded in the recent systematic fauna survey of Dharawal SCArea, Dharawal NR and adjacent crown lands (DECC 2007d).
**Green and Golden Bell Frog	Endangered	1980s (Australian Museum record)	Uncertain	Only known record from the generalised locality of ‘Darkes Forest’. No recent records from the site or adjacent areas and considered to be locally extinct in the area (DEC 2005b).

Species	Threat Category*	Last Recorded	Tenure	Comments
Littlejohn's Tree Frog	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea	This site is critically important for this species within the Greater Southern Sydney region (DECC 2007b, d). Rare with scattered records in upland swamps and associated headwater streams (DECC 2007d). Amphibian chytrid has been detected in several tadpoles of this species sampled within the site in early 2007 (G. Daly, fauna consultant, pers. comm.).
Rosenberg's Goanna	Vulnerable	2007 (DECC 2007d)	Widespread	An important area for this species within the CMA (DECC 2007d). Scattered records primarily in Dharawal SCArea in upland swamps, exposed sandstone woodlands and eastern gully forests (DECC 2007d). Frequently found roadkilled on the Southern Freeway (K. Madden and M. Schulz, DECC, unpublished records).
Broad-headed Snake	Endangered	2005 (Atlas record)	Crown: Dharawal SCArea; possibly elsewhere	Only four records documented in the last 10 years in exposed sandstone woodlands with rock outcrops and hollow-bearing trees within the site (Atlas of NSW Wildlife records). None were recorded in the recent systematic fauna survey of Dharawal SCArea, Dharawal NR and adjacent crown lands (DECC 2007d).
Square-tailed Kite	Vulnerable	2007 (Atlas record)	Uncertain	The only record is from Maddens Plains adjacent to the Southern Freeway (Atlas of NSW Wildlife record).
Glossy Black-Cockatoo	Vulnerable	2004 (Atlas record)	Crown: Dharawal SCArea, private (Darkes Forest)	Uncommon with only three records documented in the last 10 years in eastern and western gully forests with Black She-oak <i>Allocasuarina littoralis</i> from Dharawal SCArea and the Darkes Forest area (Atlas of NSW Wildlife records).
Gang-gang Cockatoo	Vulnerable	2007 (DECC 2007d)	Widespread	Uncommon with scattered records across the site from upland swamps, exposed sandstone woodlands, western gully forests and shale forests (DECC 2007d).
Turquoise Parrot	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea, former North Cliff Colliery area	Rare visitor, with two records from exposed sandstone woodland (DECC 2007d; Atlas of NSW Wildlife record).
Powerful Owl	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea; West Cliff Colliery	Scattered records primarily from eastern gully forest in the O'Hares Creek valley (DECC 2007d; Atlas of NSW Wildlife records).
**Eastern Ground Parrot (EXTINCT)	Vulnerable	1980s (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea	Not recorded in the last 20 years and presumed locally extinct (DECC 2007d).
**Eastern Bristlebird (EXTINCT)	Endangered	1960s (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea	Not recorded since the 1960s and presumed locally extinct (DECC 2007d).

Species	Threat Category*	Last Recorded	Tenure	Comments
Spotted-tailed Quoll	Vulnerable	1999 (Atlas record)	Crown: Dharawal SCArea and adjacent Crown land	The only recent record is from Lysaghts Road in Jan 1999 (Atlas of NSW Wildlife record). Status uncertain.
Koala	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea, private	The Campbelltown population extends to upper Georges River sandstone woodland and western gully forests along watercourses and on adjacent slopes in exposed sandstone woodlands in the western section of the site west of Lysaghts Road (DECC 2007d). The Georges River supports high quality habitat which forms part of a corridor between the Campbelltown and Avon/Nepean colonies and forms part of the Cumberland Koala Linkage (DECC 2007a).
Eastern Pygmy-possum	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea; possibly elsewhere	Moderately common in upland swamps and exposed sandstone woodlands within the site (DECC 2007d; Atlas of NSW Wildlife records).
Yellow-bellied Glider (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Crown: Dharawal SCArea	Reported from western gully forest along O'Hares Creek adjacent to Stokes Creek junction in Jan 1999 (Atlas of NSW Wildlife record). Since there are no confirmed records from the Woronora Plateau area (DECC 2007b), this record must be considered as unconfirmed.
Grey-headed Flying-fox	Vulnerable	2007 (DECC 2007d)	Widespread	Forages widely across the site in a variety of habitats such as exposed sandstone woodlands and western gully forests when suitable trees and shrubs are in flower or fruit (DECC 2007d, Atlas of NSW Wildlife records). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea; possibly elsewhere	Detected using Anabat in Dharawal SCArea in upland swamps and eastern gully forests (DECC 2007d; Atlas of NSW Wildlife records). Likely to forage more widely across the site than the few records indicate. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea; possibly elsewhere	Scattered records in upland swamps, exposed sandstone woodlands, eastern gully forests and western gully forests (DECC 2007d; Atlas of NSW Wildlife records). One roost located in an overhang along Stokes Creek downstream of the weir (DECC 2007d). There are likely to be other roosts present within the site.

Species	Threat Category*	Last Recorded	Tenure	Comments
Southern Myotis	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal NR, Dharawal SCArea; possibly elsewhere	Widespread along larger watercourses within the site, such as the Georges River and O'Hares, Maddens and Stokes Creeks. Also detected at the water-filled quarry at the end of 10U Fire Trail, Dharawal SCArea. One small roost located in an overhang on the edge of O'Hares Creek (DECC 2007d).
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	2007 (DECC 2007d)	Crown: Dharawal SCArea	Unconfirmed records by Anabat from several sites in Dharawal SCArea. The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).
Greater Broad-nosed Bat	Vulnerable	2007 (DECC 2007d)	Widespread	Scattered records in upland swamps, eastern gully forests and western gully forests (DECC 2007d; Atlas of NSW Wildlife records). Likely to occur more widely across the site than the few records indicate, such as in areas of higher fertility soils. Also likely to roost in tree hollows within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Two cave-dwelling bat roosts located in deep overhangs on O'Hares and Stokes Creeks (*Note:* there are likely to be other cave-dwelling bat roosts within the site).

Identified Threats to Fauna Values:

High: Impacts of high intensity fire; development of adjacent lands resulting in impacts on water quality and ecosystem integrity; alteration to habitat and water channel characteristics following subsidence and streambed cracking due to longwall mining (in some sections of the site); weed infestation, particularly the invasion of upland swamps by Pampas Grass; water quality of the major watercourses such as the Georges River and Maddens Creek; trail bike and horse riding resulting in erosion, weed invasion and hydrological changes particularly in upland swamps; the spread of the disease *Chlamydia* in the Koala population; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; bush rock removal and the illegal collection of reptiles, particularly the Broad-headed Snake; road mortality, particularly on the Southern Freeway and Appin Road; impacts associated with easements within the area, such as for high-voltage powerlines; habitat degradation from Rusa Deer; rubbish dumping; competition for hollows by feral Honeybees *Apis mellifera*; impacts of Rabbit grazing.



Much of the vegetation is recovering from the intense 2001 wildfire. M. Schulz/DECC



Major roads bisecting the area result in a large number of mortalities. M. Schulz/DECC



Several threatened species that formerly occurred, such as this Eastern Bristlebird are now locally extinct. M. Schulz

Land Management:

Complex, although much of the area occurs within the O'Hares Creek Special Area and is managed by DECC as Dharawal NR and Dharawal SCArea. Other parts of the site include far northern parts of the Metropolitan Special Area, bushland in the West Cliff Colliery, Cataract Scout Camp and fringing private land such as in the Darkes Forest area, on the western side of the Georges River and east of the Southern Freeway. A number of major roads (such as the Southern Freeway and Appin Road) and high-voltage powerline easements traverse the site.

References and Further Reading:

DEC (2004a, 2005b, 2006c, d), DECC (2007a, b, c, d), Harlow & Taylor (1995), Keith (1994, 2004), Keith *et al.* (2006), NSW National Parks and Wildlife Service (2000a, 2001c, d, 2002b, 2003a), Pennay *et al.* (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 – DECC (2007d); +2 – Atlas of NSW Wildlife and DECC (2007c); +3 – Observations while driving along the Southern Freeway, M. Schulz & K. Madden, DECC, unpublished data; *1 – only recorded prior to 1997 (Atlas of NSW Wildlife); *2 – only recorded prior to 1997 (DECC 2007c).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+1	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Stuttering Frog <i>Mixophyes balbus</i>	*2	E1	
Haswell's Froglet <i>Paracrinia haswelli</i>	+1	P	RS
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	*1	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	+1	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	*2	E1	
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Blue Mountains Tree Frog <i>Litoria citropa</i>	+1	P	
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Freycinet's Frog <i>Litoria freycineti</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Jervis Bay Tree Frog <i>Litoria jervisiensis</i>	+1	P	
Broad-palmed Frog <i>Litoria latopalmata</i>	+2	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Littlejohn's Tree Frog <i>Litoria littlejohni</i>	+1	V	
Naked Fingered Frog <i>Litoria nudidigita</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+1	P	
Stony Creek Frog <i>Litoria wilcoxii</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+2	P	
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Bold-striped Cool-skink <i>Acritoscincus duperreyi</i>	+1	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Sheoak Skink <i>Cyclodomorphus michaeli</i>	+2	P	RS
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+2	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+1	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	*1	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Mustard-bellied Snake <i>Drysdalia rhodogaster</i>	+1	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+2	E1	

Species	Status	Legal Status	Regional Status
Mainland Tiger Snake <i>Notechis scutatus</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+2	P	RS
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+2	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Square-tailed Kite <i>Lophoictinia isura</i>	+2	V	
Whistling Kite <i>Haliastur sphenurus</i>	+3	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+3	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+1	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+1	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Brown Falcon <i>Falco berigora</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Spotless Crane <i>Porzana tabuensis</i>	+1	P	RS
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Black-fronted Dotterel <i>Elseya melanops</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+2	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	+1	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia placida</i>	+1	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+1	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+1	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+2	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+1	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+2	P	
Turquoise Parrot <i>Neophema pulchella</i>	+1	V	
Eastern Ground Parrot <i>Pezoporus wallicus wallicus</i>	*1	V	Extinct
Pallid Cuckoo <i>Cuculus pallidus</i>	+2	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+1	P	RS
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+1	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Fork-tailed Swift <i>Apus pacificus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Red-browed Treecreeper <i>Climacteris erythroptus</i>	+1	P	RS
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Eastern Bristlebird <i>Dasyornis brachypterus</i>	*1	E1	Extinct
Pilotbird <i>Pycnoptilus floccosus</i>	+1	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Jacky Winter <i>Microeca fascinans</i>	+2	P	RS
Scarlet Robin <i>Petroica boodang</i>	+1	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinlosoma punctatum</i>	+1	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Cicadabird <i>Coracina tenuirostris</i>	+2	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	+1	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Rufous Songlark <i>Cincloramphus mathewsi</i>	+1	P	RS
Silvereve <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+2	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	+2	V	
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Common Dunnart <i>Sminthopsis murina</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+1	V	
Common Wombat <i>Vombatus ursinus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+1	V	
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Yellow-bellied Glider <i>Petaurus australis</i>	+2	V	Unconfirmed
Greater Glider <i>Petauroides volans</i>	+2	P	RS
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+1	P	RS
Common Wallaroo <i>Macropus robustus</i>	+2	P	RS
Red-necked Wallaby <i>Macropus rufogriseus</i>	+1	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+1	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+1	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+1	P	RS
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	

Species	Status	Legal Status	Regional Status
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Bush Rat <i>Rattus fuscipes</i>	+1	P	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	
Feral Goat <i>Capra hircus</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 4: BOTANY WETLANDS

Location:

Botany Wetlands downstream from Gardeners Road, including adjacent remnant vegetation in Eastlake and The Lakes Golf Courses; Sir Joseph Banks Park; and the Botany foreshore and backing vegetation from the boundary of Sydney Airport to the east side of Penrhyn Bay (refer to Map i).

Relative Area Size in CMA:

Small

Sub-catchment:

Eastern Beaches

Local Government Area:

Botany Bay

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	18	9
Commonwealth Land	4	2
Remaining Public Land	0	0
Other	172	89
Total	193	100

Environmental Setting:



Roosting Bar-tailed Godwits and other shorebirds, Penrhyn Bay. M. Schulz/DECC



Botany Wetlands bordered by Eastlakes and The Lakes Golf Courses. M. Schulz/DECC



Extensive reedbeds; important habitat for a variety of cryptic waterbirds such as crakes and rails. M. Schulz/DECC

The Botany Wetlands incorporates the largest freshwater wetland complex in the CMA. Situated on and adjoining Botany Bay, the area includes extensive wetlands, patches of native vegetation cover as well as intertidal flats, sandy beaches and open water. The primary vegetation formations associated with the underlying sandmass are dry sclerophyll forests and heaths. This site is not directly linked by continuous vegetation to any other conservation reserves within the region. Four priority fauna habitats occur: forested wetland, freshwater wetland, saltwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Small, Isolated
<i>Tree Hollows:</i>	Nil	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease in Fauna
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: Important for migratory shorebirds and other waterbirds; including a migratory shorebird feeding and roosting area, occasionally supporting a nesting colony of the endangered Little Tern; and acting as a drought refuge for a diverse range of threatened and regionally significant species that are rare within the CMA, such as the Little Bittern, Australasian Shoveler, Spotless Crake and Glossy Ibis.



Bar-tailed Godwits regularly roost and feed at Penrhyn Bay. M. Schulz



Short-necked Turtles are common in the Botany Wetlands. M. Schulz/DECC



Black Swan: a common bird in open water sections of Botany Wetlands. M. Schulz/DECC

Priority Fauna Species Review:

There have been 190 vertebrate fauna species (excluding fish, marine species, vagrant shorebirds and escapees) documented within this area in the last 10 years: 163 birds, 13 reptiles, eight mammals and six frogs. Of these two are considered endangered, 10 vulnerable and one endangered ecological community occurs (these are discussed below). A further 49 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2007 (Current study)	Botany Bay Council	Status uncertain. 1000s of tadpoles were released into Sir Joseph Banks Park in 1998 (Taronga and Western Plains Zoos 2007).
Freckled Duck	Vulnerable	2007 (Birdline NSW)	Crown: Sydney Water	Occasional visitor to open water areas in the Botany Wetlands during drought periods.
Black Bittern	Vulnerable	2003 (Vella 2003a)	Crown: Sydney Water	A rare visitor to the Botany Wetlands.
Australasian Bittern	Vulnerable	2003 (Russill & Russill 2003)	Crown: Sydney Water	Status uncertain. Likely to be an occasional visitor to the Botany Wetlands.
Black-tailed Godwit	Vulnerable	2004 (Madvig 2004)	Crown: Sydney Ports, NSW Maritime	A rare summer visitor to Penrhyn Bay.
Terek Sandpiper	Vulnerable	2006 (Buchan 2006)	Crown: Sydney Ports, NSW Maritime	A rare summer visitor to Penrhyn Bay.
Great Knot	Vulnerable	2004 (Gardner 2004)	Crown: Sydney Ports, NSW Maritime	A rare summer visitor to Penrhyn Bay.
Sanderling	Vulnerable	1998 Gladwin (1998)	Crown: Sydney Ports, NSW Maritime	A rare summer visitor to Penrhyn Bay.
**Comb-crested Jacana (VAGRANT)	Vulnerable	1950s (Gardner 2004)	Uncertain	A single record from Eastlakes Golf Course in the 1950s (Gardner 2004). Vagrant.

Species	Threat Category*	Last Recorded	Tenure	Comments
Pied Oystercatcher	Vulnerable	2007 (Current study)	Crown: Sydney Ports, NSW Maritime	An uncommon visitor to Penrhyn Bay. No nesting records.
Lesser Sand Plover	Vulnerable	2007 (Current study)	Crown: Sydney Ports, NSW Maritime	A rare summer visitor to Penrhyn Bay.
**Greater Sand-plover	Vulnerable	1986 (Atlas record)	Crown: Sydney Ports, NSW Maritime	Recorded in June 1986. Likely to be a rare visitor to Penrhyn Bay.
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown: Sydney Ports, NSW Maritime	Individuals from this community use Penrhyn Bay and the Botany Wetlands to roost and feed.
Little Tern	Endangered	2007 (Current study)	Crown: Sydney Ports, NSW Maritime	Sporadically nests at Penrhyn Bay e.g. 2003 and 2006 (Nordstrom 2003b; S. Callaghan, DECC, pers. comm.). Irregularly forages over open water in the Botany Wetlands (e.g. Vella 2003b; Birdline NSW records).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: Little Tern nesting site at Penrhyn Bay; minor multi-species migratory shorebird roost and feeding area at Penrhyn Bay; minor migratory shorebird roost and feeding area in the Botany Wetlands, particularly for Latham's Snipe and the Sharp-tailed Sandpiper; small colony of nesting waterbirds (particularly Great and Little Black Cormorants) in Botany Wetlands.

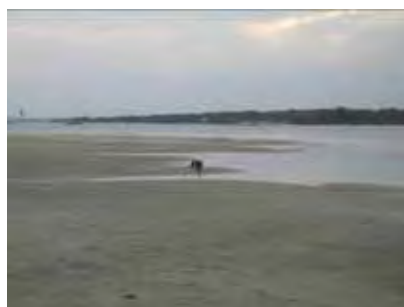
Identified Threats to Fauna Values:

High: Loss of Little Tern breeding habitat and shorebird roosting habitat; reclamation and loss of wetland habitat; disturbance due to high levels of public visitation and from jet skis; disturbance by uncontrolled domestic dogs; water quality; weed infestation; impacts from oil spill; infection of frogs by amphibian chytrid causing the disease chytridiomycosis, feral fish populations; mangrove encroachment into saltmarsh areas.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); impacts of Rabbit grazing; entanglement in discarded fishing tackle.



The Port Botany expansion will have an unknown impact on the migratory shorebirds using the area. M. Schulz/DECC



Uncontrolled dog on the sand flats at Penrhyn Bay. M. Schulz/DECC



Signage protecting Little Terns nesting at Penrhyn Bay, 2007. M. Schulz/DECC

Land Management:

The land tenure of the site is complex. There are a multitude of land owners and managers found within and adjoining the site, including a number of government agencies, Botany Bay Council, two

golf courses and private land owners. Any work within this area will require a cooperative approach to managing the site, in conjunction with other migratory shorebird/waterbird sites in the Botany Bay/lower Georges River area such as those used by Endangered Ecological Shorebird community occurring on the relict tidal delta sands of Botany Bay. Management is perhaps best served by the development of an overall plan of management.

References and Further Reading:

Buchan (2006), DEC (2005b), Gardner (2004), Geering *et al.* (2007), Gladwin (1998), Hoskin *et al.* (1991), Keith (2004), Madvig (2004), NSW Department of Planning (2007), NSW National Parks and Wildlife Service (2001c), NSW Scientific Committee (1998), Nordstrom (2003a, b), Russill & Russill (2003), Straw (2005), Sydney Water (2004, 2006), Taronga and Western Plains Zoos (2007), Vella (2003a, b), White (2006).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – White (2006); +5 – Gardner (2004); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Gardner 2004).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
<i>Amphibians:</i>			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+4	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+1	E1	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
<i>Reptiles:</i>			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+4	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Sheoak Skink <i>Cyclodomorphus michaeli</i>	+2	P	RS
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+4	P	
Weasel Shadescink <i>Saproscincus mustelinus</i>	+4	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
<i>Birds:</i>			
Stubble Quail <i>Coturnix pectoralis</i>	+3	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+3	P	RS
Freckled Duck <i>Stictonetta naevosa</i>	+3	V	
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+5	P	
Mallard <i>Anas platyrhynchos</i>	+3	U	

Species	Status	Legal Status	Regional Status
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchotis</i>	+5	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	+3	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+3	P	
White-necked Heron <i>Ardea pacifica</i>	+5	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+1	P	
Cattle Egret <i>Ardea ibis</i>	+3	P	
Striated Heron <i>Butorides striatus</i>	+3	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	+3	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+3	V	
Australasian Bittern <i>Botaurus poiciloptilus</i>	+3	V	
Glossy Ibis <i>Plegadis falcinellus</i>	+5	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+5	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+5	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	+3	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+3	P	RS
Swamp Harrier <i>Circus approximans</i>	+3	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+3	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+3	P	
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+3	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+3	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	+1	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	+3	P	RS
Black-tailed Godwit <i>Limosa limosa</i>	+3	V	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+3	P	RS
Marsh Sandpiper <i>Tringa stagnatilis</i>	+3	P	RS
Common Greenshank <i>Tringa nebularia</i>	+3	P	RS
Wood Sandpiper <i>Tringa glareola</i>	+3	P	RS
Terek Sandpiper <i>Xenus cinereus</i>	+3	V	
Common Sandpiper <i>Actitis hypoleucos</i>	+3	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+3	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+3	P	RS
Great Knot <i>Calidris tenuirostris</i>	+3	V	
Red Knot <i>Calidris canutus</i>	+3	P	RS
Sanderling <i>Calidris alba</i>	+3	V	
Red-necked Stint <i>Calidris ruficollis</i>	+1	P	RS
Pectoral Sandpiper <i>Calidris melanotos</i>	+3	P	
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+2	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	+1	P	RS
Comb-crested Jacana <i>Irediparra gallinacea</i>	*1	V	
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	+1	P	
Banded Stilt <i>Cladorhynchus leucocephalus</i>	*1	P	
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	*1	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+1	P	RS
Grey Plover <i>Pluvialis squatarola</i>	+3	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	+1	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Lesser Sand Plover <i>Charadrius mongolus</i>	+1	V	
Greater Sand Plover <i>Charadrius leschenaultii</i>	*	V	
Black-fronted Dotterel <i>Elsayornis melanops</i>	+1	P	
Red-kneed Dotterel <i>Erythrogonys cinctus</i>	+3	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+3	P	
Kelp Gull <i>Larus dominicanus</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Gull-billed Tern <i>Sterna nilotica</i>	+3	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	+3	P	
Common Tern <i>Sterna hirundo</i>	+1	P	RS
Little Tern <i>Sterna albifrons</i>	+1	E1	
Fairy Tern <i>Sterna nereis</i>	+3	P	

Species	Status	Legal Status	Regional Status
Whiskered Tern <i>Chlidonias hybridus</i>	+3	P	RS
White-winged Black Tern <i>Chlidonias leucopterus</i>	+3	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+3	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	*	P	
Little Corella <i>Cacatua pastinator</i>	+5	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+3	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+3	P	
Fantailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Pacific Koel <i>Eudynamys scolopacea</i>	+5	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+5	P	
Barn Owl <i>Tyto alba</i>	+5	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+5	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+3	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+3	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+3	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+3	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS

Species	Status	Legal Status	Regional Status
Australasian Figbird <i>Sphecotheres vieilloti</i>	+3	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+5	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Eurasian Skylark <i>Alauda arvensis</i>	+1	U	
Australian Pipit <i>Anthus australis</i>	+5	P	RS
Yellow Wagtail <i>Motacilla flava</i>	+3	P	
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+1	U	
European Goldfinch <i>Carduelis carduelis</i>	+5	U	
European Greenfinch <i>Carduelis chloris</i>	+1	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Hirundo nigricans</i>	+5	P	
Fairy Martin <i>Petrochelidon ariel</i>	+5	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+5	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+3	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Brown Songlark <i>Cincloramphus cruralis</i>	+3	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
<i>Mammals:</i>			
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Gould's Wattled Bat <i>Chalinobatus gouldii</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 5: HOLSWORTHY MILITARY RESERVE

Location:

Holsworthy Military Reserve and extending north on the eastern side of the Georges River to include remnant bushland in the Steele Barracks and Moorebank Military Reserve (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Campbelltown, Liverpool and Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	16	<1
Commonwealth Land	17576	99
Remaining Public Land	30	<1
Other	136	1
Total	17759	100

Environmental Setting:



This site comprises an active military exercise area. M. Schulz/DECC



Much of the site is remote and little accessed by the public, such as on the eastern side of O'Hares Creek. M. Schulz/DECC



The site supports one of the largest remnants of Cumberland Plain woodland in the CMA. M. Schulz/DECC

This large area although a military reserve supports a wide diversity of fauna in a range of habitats, with very restricted access to the general public. It is bounded by extensive areas of high quality fauna habitat; to the west by the Georges River and O'Hares Creek, to the south by Dharawal SCA, and to the east by Woronora Special Area and Heathcote NP. This site is located within a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). It is located on the western edge of Woronora Plateau grading to the eastern edge of the Cumberland Plain. As a result it supports a diversity of terrain dominated by Hawkesbury Sandstone with extensive rocky areas, deeply incised valleys and scattered deposits of swamp alluvium particularly in the south. This terrain grades to Ashfield Shale landscapes of undulating hills and valleys on horizontal Triassic shale and shalestone, a coastal extension of the Cumberland Plain (DEC 2005c). A small area of Georges River alluvial plain occurs on the northwestern edge of the area. A reflection of the diversity of terrain is the diversity of vegetation communities, which includes significant patches of vegetation associated with Hawkesbury Sandstone grading to Shale Gravel Transition Forest, Castlereagh Swamp Woodland and River-flat Eucalypt Forest on Coastal Floodplains (all of these communities are listed as endangered ecological communities under the TSC Act 1995; DEC 2005c). The site is particularly important in supporting one of the largest and most intact patches of remnant Cumberland Plain vegetation (DEC 2005c). The majority of the site provides facilities for live firing of the majority of weapons currently in service with the Australian Army, demolition ranges, driver training areas, and an important bush-setting training ground for defense personnel (AMBS 1995a). As a result of the history of the area unexploded ordnances potentially occur across much of the site, providing an effective deterrent against public access. Due to the live firing ranges and helicopter activities noise and vibration pollution are at a frequent high level across parts of the site, while some reptile habitat such as rocky outcrops may be impacted by continued shelling from artillery and rock stacking to provide cover for military personnel during exercises (AMBS 1995a; D. Andrew, DECC, pers. comm.). Fire is frequent with some wildfire the

result of live firing and pyrotechnic exercises (AMBS 1995a). The site supports five priority fauna habitats: forested wetland, alluvial forest and woodland, grassy woodland, freshwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: Supports a large diversity of fauna, many of which are limited in distribution within the CMA, including a number of species associated with heathlands, such as the threatened Giant Burrowing Frog, Red-crowned Toadlet and Rosenberg's Goanna; species associated with Cumberland Plain woodland such as the threatened Square-tailed Kite and regionally significant Jacky Winter and Restless Flycatcher; and species associated with the Georges River and fringing alluvial woodland such as the threatened Southern Myotis, Koala and Gang-gang Cockatoo.



Koalas are widespread, with a concentration of records in the western half of the site. M. Schulz



The status of a number of threatened species within the site is poorly known, such as the Large-eared Pied Bat. M. Pennay



The site supports one of the only populations of the White-winged Chough remaining within the CMA. N. Williams

Priority Fauna Species Review:

There have been 236 vertebrate fauna species (excluding fish and unconfirmed species) documented within this area in the last 10 years: 146 birds, 41 mammals, 32 reptiles and 17 frogs. Of these three species are considered endangered (excluding unconfirmed species) and 13 species as vulnerable (discussed below). A further 55 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2005 (Atlas record)	Crown: Dept of Defence	Scattered records in areas of deep sandy soil in upland swamps, heath and fringing heath woodlands and exposed sandstone woodlands (AMBS 1995b; Atlas of NSW Wildlife record).
Red -crowned Toadlet	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	Scattered records in minor drainage lines and depressions in a variety of habitats associated with Hawkesbury sandstone (AMBS 1995b; Atlas of NSW Wildlife record).
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: Dept of Defence	A recent record west of Moorebank Avenue and south

Species	Threat Category*	Last Recorded	Tenure	Comments
				of the East Hills Railway (Atlas of NSW Wildlife record). Current status in the area is unknown (DEC 2005b).
Rosenberg's Goanna	Vulnerable	2007 (M. Schulz, unpublished records)	Crown: Dept of Defence	Status uncertain. The only record is of a dead individual on Heathcote Road in Feb 2007 (M. Schulz, unpublished records).
Broad-headed Snake	Endangered	2005 (Atlas record)	Crown: Dept of Defence	Status uncertain. Only one recent documented record from the far south of the site. Evidence was seen within the Holsworthy Military Reserve of illegal searching for reptiles, probably targeting this species (AMBS 1995a).
Square-tailed Kite	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	Status uncertain. The only record is of an individual flying over Cumberland Plain woodland in the Small Arms Firing Range (Atlas of NSW Wildlife record).
Gang-gang Cockatoo	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	The only record is of two individuals from alluvial woodland adjacent to the Georges River (Atlas of NSW Wildlife record). Likely to be a rare visitor to the site.
Swift Parrot	Endangered	2006 (Atlas record)	Crown: Dept of Defence	Recorded feeding in flowering Swamp Mahogany <i>Eucalyptus robusta</i> in May 2006 in partially cleared remnant woodland (Atlas of NSW Wildlife record).
**Turquoise Parrot	Vulnerable	1960s (AMBS 1995b)	Crown: Dept of Defence	Old records. May possibly still occur as a rare visitor, such as found in the Dharawal and the Metropolitan Special Area (DECC 2007b, d).
Powerful Owl	Vulnerable	1999 (DECC 2007d)	Crown: Dept of Defence	Status uncertain. A small number of records suggest this species is rare and restricted within the site (AMBS 1995b; Atlas of NSW Wildlife records).
Brown Treecreeper (UNCONFIRMED)	Vulnerable	2002 (Atlas record)	Crown: Dept of Defence	The only two records are from Birds Australia records. Since no systematic surveys have detected this species (e.g. AMBS 1995a, b; DEC 2006) and old records from observers in the site failed to mention the species these records must be regarded as unconfirmed.
**Speckled Warbler	Vulnerable	1960s (AMBS 1995b)	Crown: Dept of Defence	Likely to be locally extinct.
**Hooded Robin	Vulnerable	1960s (AMBS 1995b)	Crown: Dept of Defence	Likely to be locally extinct.
**Diamond Firetail	Vulnerable	1960s (AMBS 1995b)	Crown: Dept of Defence	Likely to be a rare visitor.
Spotted-tailed Quoll	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	Status uncertain, possibly a rare resident as a small number of sightings have been made in the past decade (Atlas of NSW Wildlife records).
Koala	Vulnerable	2006 (Atlas records)	Crown: Dept of Defence	Widespread, although more records in the western half of the site (e.g. AMBS 1995b;

Species	Threat Category*	Last Recorded	Tenure	Comments
Squirrel Glider (UNCONFIRMED)	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	Atlas of NSW Wildlife records). One individual seen in Blackbutt <i>Eucalyptus pilularis</i> adjacent to the Georges River in 2006 may have been this species (DEC 2006). Follow-up surveys are required to confirm its presence in the site.
Grey-headed Flying-fox	Vulnerable	2006 (Atlas records)	Crown: Dept of Defence	Forages widely across the site in a variety of habitats when suitable trees and shrubs are in flower or fruit (DECC 2007d; Atlas of NSW Wildlife records). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Yellow-bellied Sheathtail-bat (VAGRANT)	Vulnerable	2004 (Atlas record)	Crown: Dept of Defence	Three records identified by ultrasonic call using Anabat. This species is regarded as a vagrant to the CMA (DECC 2007b; H. Parnaby, DECC, pers. comm.).
Large-eared Pied Bat	Vulnerable	1999 (Atlas record)	Crown: Dept of Defence	Status uncertain. A single individual recorded adjacent to O'Hares Creek (Atlas of NSW Wildlife record).
Eastern Bentwing-bat	Vulnerable	1999 (Atlas record)	Crown: Dept of Defence	As for the Large-eared Pied Bat.
Southern Myotis	Vulnerable	2006 (Atlas record)	Crown: Dept of Defence	Several records along the Georges River and O'Hares Creek (Atlas of NSW Wildlife record). Likely to occur along all major watercourses within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	2007 (Atlas record)	Crown: Dept of Defence	Unconfirmed records by Anabat from several localities in the site. The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattle Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).
Greater Broad-nosed Bat	Vulnerable	2007 (Atlas record)	Crown: Dept of Defence	A small number of records in a variety of forest types on higher nutrient soils (Atlas of NSW Wildlife records). Likely to occur more widely across the site. Also likely to roost in tree hollows within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Occasionally used by small numbers of migratory shorebirds along Georges River. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded at many localities on Ashfield Shales in the northern part of the site (Atlas of NSW Wildlife records).

Identified Threats to Fauna Values:

High: Habitat loss; impacts of high intensity fire; impacts of military exercises and site management; the spread of the disease *Chlamydia* in the Koala population; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Erosion; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); the illegal collection of reptiles, particularly the Broad-headed Snake; road mortality, particularly on Heathcote Road; water quality in the northern section of the site and of the Georges River; impacts associated with easements within the area, such as for high-voltage powerlines; weed infestation; habitat degradation from Rusa Deer; competition for hollows by feral Honeybees *Apis mellifera*; impacts of Rabbit grazing.



Trenches are common, evidence of the importance of the site as a Department of Defence training area. M. Schulz/DECC



One of the most recent records of the Spotted-tailed Quoll within any site in the CMA was from this area. N. Fenton, NPWS



Several threatened species that formerly occurred, such as this Speckled Warbler are now locally extinct. N. Williams

Land Management:

This site primarily comprises Holsworthy Military Reserve, Steele Barracks and Moorebank Military Reserve and is managed by the Department of Defence.

References and Further Reading:

Australian Museum Business Services (1995a, b), DEC (2004a, 2005b, c, 2006), DECC (2007a, b, c, d), Harlow & Taylor (1995), Keith (2004), NSW National Parks and Wildlife Service (2000a, 2001c, d, 2003a), Pennay *et al.* (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 – Atlas of NSW Wildlife; +2 - Australian Museum Business Services (1995a, b); +3 – Records along Heathcote Road; 4 - M. Schulz, DECC, unpublished records; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife); *2 - only recorded prior to 1997 (Australian Museum Business Services 1995a, b).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+1	V	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Haswell's Froglet <i>Paracrinia haswelli</i>	+1	P	RS
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Smooth Toadlet <i>Uperoleia laevigata</i>	+1	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+1	E1	
Green Tree Frog <i>Litoria caerulea</i>	+1	P	RS
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Freycinet's Frog <i>Litoria freycineti</i>	+1	P	RS
Broad-palmed Frog <i>Litoria latopalmata</i>	+1	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+1	P	
Reptiles:			
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+1	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+1	P	RS
Burton's Legless-lizard <i>Lialis burtonis</i>	+1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	*1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+1	P	RS
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+3	V	
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Tree-base Litter-skink <i>Carlia foliorum</i>	+1	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+1	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+1	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Red-naped Snake <i>Furina diadema</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+1	E1	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+1	P	RS
Birds:			
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Cattle Egret <i>Ardea ibis</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Square-tailed Kite <i>Lophoictinia isura</i>	+1	V	
Whistling Kite <i>Haliastur sphenurus</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+3	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+3	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Australian Hobby <i>Falco longipennis</i>	+1	P	
Brown Falcon <i>Falco berigora</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Common Greenshank <i>Tringa nebularia</i>	+1	P	RS
Black-fronted Dotterel <i>Euseyornis melanops</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Common Bronzewing <i>Phaps chalcoptera</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Brush Bronzewing <i>Phaps elegans</i>	*2	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	+1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+1	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	*1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	*2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+2	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Turquoise Parrot <i>Neophema pulchella</i>	*2	V	
Brush Cuckoo <i>Cacomantis variolosus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalıs</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Brown Treecreeper <i>Climacteris picumnus</i>	+1	V	Unconfirmed
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Pilotbird <i>Pycnoptilus floccosus</i>	*2	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	*2	P	RS

Species	Status	Legal Status	Regional Status
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+1	P	RS
Speckled Warbler <i>Chthonicola sagittata</i>	*2	V	
Weebill <i>Smicromis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	*2	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Jacky Winter <i>Microeca fascinans</i>	+1	P	RS
Scarlet Robin <i>Petroica boodang</i>	+1	P	RS
Red-capped Robin <i>Petroica goodenovii</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Hooded Robin <i>Melanodryas cucullata</i>	*2	V	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+1	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	

Species	Status	Legal Status	Regional Status
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Little Raven <i>Corvus mellori</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	+1	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Diamond Firetail <i>Stagonopleura guttata</i>	*2	V	
Beautiful Firetail <i>Stagonopleura bella</i>	+1	P	RS
European Goldfinch <i>Carduelis carduelis</i>	+1	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Platypus <i>Ornithorhynchus anatinus</i>	+1	P	RS
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	+1	V	
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Common Dunnart <i>Sminthopsis murina</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Koala <i>Phascolarctos cinereus</i>	+1	V	
Common Wombat <i>Vombatus ursinus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Feathertail Glider <i>Acrobates pygmaeus</i>	*1	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Squirrel Glider <i>Petaurus norfolcensis</i>	+1	V	Unconfirmed

Species	Status	Legal Status	Regional Status
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+1	P	RS
Common Wallaroo <i>Macropus robustus</i>	+1	P	RS
Red-necked Wallaby <i>Macropus rufogriseus</i>	*1	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Little Red Flying-fox <i>Pteropus scapulatus</i>	+1	P	
Yellow-bellied Sheathtail-bat <i>Saccolaimus flaviventris</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+1	P	
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	+1	V	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+1	V	Unconfirmed
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+1	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+1	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
New Holland Mouse <i>Pseudomys novaehollandiae</i>	+1	P	RS
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Bush Rat <i>Rattus fuscipes</i>	*1	P	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	
Red Deer <i>Cervus elaphus</i>	+1	U	

Site 6: MIDDLE HARBOUR VALLEY

Location:

The upper sections of Middle Harbour and adjacent bushland areas from Sugarloaf Bay upstream to the headwaters of Middle Harbour Creek in Gordon, St Ives, and Belrose including Garigal NP (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Middle Harbour

Local Government Area:

Ku-ring-gai, Manly, Warringah and Willoughby

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	1238	46
Crown Land	467	17
Commonwealth Land	0	0
Remaining Public Land	327	12
Other	678	25
Total	2710	100

Environmental Setting:



Bushland fringing Castle Cove, Middle Harbour. M. Schulz/DECC



Remnant Blue Gum High Forest, Dalrymple-Hay NR. M. Schulz/DECC



The site is typified by wet gully forest fringed by urban development. M. Schulz/DECC

A large irregularly shaped site centred on a deep north – south valley containing Middle Harbour and Middle Harbour Creek. The site extends to the northern edge of the CMA boundary and includes sections of Garigal NP. In parts of the site, remnant vegetation is less than 100m wide with some of this band being impacted by encroachment from adjacent houses. This large area ranges from tidal flats of Quaternary marine sediments in parts of Middle Harbour to deeply incised gullies with rocky outcrops and plateaus associated with Hawkesbury Sandstones to Wianamatta Group shales in the headwaters. As a result of the diverse geomorphology a variety of vegetation communities occur. Those associated with the Wianamatta group shales in the headwaters include remnant patches of the endangered ecological community Blue Gum High Forest characterised by Sydney Blue Gum *Eucalyptus saligna* and Blackbutt *E. pilularis*. The largest stand of Blue Gum High Forest occurs within the site in the Dalrymple-Hay NR and adjoining private and Sydney Water land. Well developed gully forest dominated by Blackbutt and stands of Sydney Blue Gum occur along gullies and creeklines where downwashed Wianamatta Group clay deposits are present. In some gullies patches of closed forest occur dominated by wet forest species. Vegetation leading down to Middle Harbour and Middle Harbour Creek and some of its tributaries are characterised by vegetation associated with Hawkesbury Sandstone gullies and slopes. In these areas sandstone ridges, cliffs, rock outcrops and some overhangs are a feature. Elsewhere vegetation communities associated with Hawkesbury Sandstone include Duffys Forest endangered ecological community which grows on shale lenses and lateritic soils such as in the Manly Dam Reserve; heathland dominated by such species as Scrub Sheoak *Allocasuarina distyla*, Heath Banksia *Banksia ericifolia* and Tick Bush *Kunzea ambigua*; mixed woodland; and mallee woodland dominated by Yellow-topped Mallee Ash *Eucalyptus luehmanniana*, Red Bloodwood *Corymbia gummifera* and Sandstone Stringybark *E. oblonga*. The tidal sections of Middle Harbour Creek upstream to Bungaroo are characterised by steep slopes ranging from 100 to 150 m high lined with a variable width band of mangroves dominated by Grey Mangrove *Avicennia marina*, in places backed by small areas of sedges and

reeds such as Bare Twig-rush *Baumea juncea* and Common Reed *Phragmites australis*, and Swamp Oak *Casuarina glauca* Floodplain Forest (an endangered ecological community). Much of the forest growing in the headwaters was extensively logged in the past resulting in few well developed hollows being present in regenerating forests. Watercourses are subject to poor water quality as a result of runoff from waste disposal areas and stormwater runoff. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*, Camphor Laurel *Cinnamomum camphora* and Privet *Ligustrum* species. Fire frequency is high in parts of the site, with many fire ignitions attributed to arson. The Middle Harbour Valley is tenuously linked to Ku-ring-gai Chase NP (within the Hawkesbury – Nepean CMA) in the St Ives area and to the Narrabeen Lake section of Garigal NP in the Belrose area. However, both these links are broken by wide, busy roads i.e. Mona Vale Road in the former and Forest Way in the latter link. The site supports six priority fauna habitats: forested wetland, rainforest, alluvial forest and woodland, heathland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: A diverse array of fauna occurs, including part of the North Sydney population of the Endangered Southern Brown Bandicoot, one of only two permanent Grey-headed Flying-fox camps within the CMA; the only documented locality for the vulnerable Sooty Owl in the northern part of the CMA; and a range of other threatened and regionally significant fauna.



The Australian Brush-turkey has recently recolonised patches of bushland within the site. M. Schulz



An important Grey-headed Flying-fox camp is located within the Ku-ring-gai Flying Fox Reserve at Gordon. M. Schulz/DECC



A pair of Australian King-Parrots investigating a hollow in a Sydney Blue Gum, Dalrymple-Hay NR. M. Schulz/DECC

Priority Fauna Species Review:

There have been 230 vertebrate fauna species (excluding fish, marine species, vagrants and escapees) documented within this area in the last 10 years: 163 birds, 31 reptiles, 27 mammals and nine frogs. Of these three are considered endangered and 14 (excluding vagrants and unconfirmed species) are considered vulnerable (discussed below). A further 49 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
**Giant Burrowing Frog	Vulnerable	1996 (Atlas record)	Private	Status uncertain. The only record is of an individual found adjacent to the Rocky Hill Track east of Garigal NP in Jan 1996 (Atlas of NSW Wildlife records).

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2007 (Atlas record)	Crown: Garigal NP; Council reserves (Ku-ring-gai and Willoughby LGA)	Scattered records across the site, including Garigal NP; reserves in Ku-ring-gai LGA (e.g. Surgeon White Reserve) and reserves in the City of Willoughby (e.g. Explosives Reserve, North Arm Reserve, Harold Reid Reserve) (White 2001; Atlas of NSW Wildlife records).
Green and Golden Bell Frog	Endangered	2002 (Atlas record)	Warringah Council	Status uncertain. One record from a reserve in the headwaters of Carroll Creek, Frenchs Forest (Atlas of NSW Wildlife record).
Rosenberg's Goanna	Vulnerable	2007 (Atlas record)	Crown: Garigal NP; Council reserves (Ku-ring-gai and Warringah LGA)	Scattered records within a variety of heath dominated habitats, including Garigal NP, Manly Dam Reserve, Moores Creek area and East Gordon Park (Atlas of NSW Wildlife records).
Black Bittern	Vulnerable	1999 (Burton 2004)	Crown: Garigal NP; Warringah Council	Status uncertain. One bird observed along Carroll Creek, Frenchs Forest in June 1999 (Burton 2004).
Osprey	Vulnerable	2005 (Atlas record)	Crown: Middle Harbour; Council reserves (Ku-ring-gai and Warringah LGA)	Rare. A single bird regularly observed in Middle Harbour in the Seaforth area in 2005 (Atlas of NSW Wildlife record); another single bird regularly observed in the North Arm of Sugarloaf Bay in 1997 and 1999 (Burton 2004).
Wompoo Fruit-Dove (VAGRANT)	Vulnerable	2000 (Burton 2000)	City of Willoughby; Ku-ring-gai Council	Vagrant. One immature on the edge of the escarpment reserve at Sailors Bay, Castlecrag in Oct 2000 (Burton 2000). Also one immature observed immediately to the north of the site at the Ku-ring-gai Council nursery on the north side of Mona Vale Road, St Ives in Oct 2000 (Morris 2000)
Superb Fruit-Dove (VAGRANT)	Vulnerable	2002 (Atlas record)	Warringah Council	Vagrant. One record from Killarney Heights (Atlas of NSW Wildlife record).
Rose-crowned Fruit-Dove (VAGRANT)	Vulnerable	2002 (Atlas record)	Warringah Council	Vagrant. One record from Forestville (Atlas of NSW Wildlife record).
Glossy Black-Cockatoo	Vulnerable	2003 (Atlas record)	Crown: Garigal NP; Warringah Council	Occasional visitor to the northern parts of the site (Atlas of NSW Wildlife records).
Swift Parrot	Endangered	2007 (Lindsay 2007)	Crown: Garigal NP; Ku-ring-gai Council	Rare visitor. The only recent documented recent record is of four individuals on the edge of Garigal NP in East Killara in May 2007 (Lindsay 2007).
Powerful Owl	Vulnerable	2007 (Atlas record)	Widespread	Scattered throughout the site, including Dalrymple-Hay NR, Garigal NP, Manly Dam Reserve, Seven Little Australians Reserve, Old Sheoak Reserve, Moores Creek Reserve, Explosives Reserve, North Arm Reserve, Willis Park and Harold Reid Reserve (White 2001; Atlas of NSW Wildlife records).
Barking Owl	Vulnerable	1999 (Atlas record)	Crown: Garigal NP	Rare visitor. One bird recorded along Cascade Track, Garigal NP in May 1999 (Atlas of NSW Wildlife record). Also earlier records from Bantry Bay in Aug and Sept 1974, and Castle Hill in June

Species	Threat Category*	Last Recorded	Tenure	Comments
				1983 (Morris 2007b) and Camp Creek in 1978 (Burton 2004).
Sooty Owl	Vulnerable	2000 (White 2001)	City of Willoughby	Population status uncertain. The only record is from escarpment reserves on the southern shoreline of Sugarloaf Bay at Castlecrag (White 2001). Interestingly Kavanagh (2004) lists no records from the northern side of Sydney Harbour within the CMA.
Masked Owl	Vulnerable	2000 (Morris 2007a)	Ku-ring-gai Council	Status uncertain. The only record is of a roadkill at St Ives in Dec 2000 (Morris 2007a).
**Eastern Bristlebird	Endangered	1905 (Burton 2004)	Uncertain	Locally extinct. Eggs were collected from the Middle Harbour catchment at Lindfield in Sept 1905 (Burton 2004).
**Spotted-tailed Quoll	Vulnerable	1993 (Atlas record)	Warringah Council	Status uncertain. No recent records. One recorded from adjacent to Wakehurst Parkway, Allambie Heights in May 1993 (Atlas of NSW Wildlife record).
Southern Brown Bandicoot	Endangered	2007 (Atlas record)	Crown: Garigal NP	A small number of records from Garigal NP, including Cascade and Frenchs Creek Track areas (DEC 2006e; Atlas of NSW Wildlife records). The population in Garigal NP is showing signs of inbreeding depression and therefore is considered at high risk of extinction (DEC 2006e).
Koala	Vulnerable	2002 (Atlas record)	Warringah Council	Status uncertain. One documented record in the headwaters of Carroll Creek, French Forest (Atlas of NSW Wildlife record). An earlier record from the same creek in 1940 (Atlas of NSW Wildlife record).
Eastern Pygmy-possum	Vulnerable	2002 (Atlas record)	Garigal NP	Status uncertain. Recorded from adjacent to Cascades Track in Garigal NP (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Beck 2007)	Widespread	Likely to forage widely across the site when suitable trees and shrubs are in flower or fruit. There is a large permanent camp present in Ku-ring-gai Flying Fox Reserve, Gordon with monthly counts ranging from a maximum of 69000 individuals in Jan 2000 to 350 in Apr 2001 (Beck 2007).
Yellow-bellied Sheath-tail-bat (VAGRANT)	Vulnerable	2005 (Basham 2005)	Crown: Dalrymple–Hay NR	Ultrasonic calls recorded by Anabat from Dalrymple–Hay NR (Basham 2005). This species is regarded as a vagrant to the CMA (DECC 2007b; H. Parnaby, DECC, pers. comm.).
East-coast Freetail-bat	Vulnerable	2005 (Basham 2005)	Crown: Dalrymple–Hay NR	Ultrasonic calls recorded by Anabat from Dalrymple–Hay NR (Basham 2005).
Eastern Bentwing-bat	Vulnerable	2004 (Atlas record)	Warringah Council	Recorded from Burnt Creek on the south side of Manly Reservoir, Balgowlah and Dalrymple–Hay NR (Basham 2005; Atlas of NSW Wildlife record).
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	2005 (Basham 2005)	Crown: Dalrymple – Hay NR	Ultrasonic calls recorded by Anabat from Dalrymple–Hay NR (Basham 2005). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in

Species	Threat Category*	Last Recorded	Tenure	Comments
				the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Regularly occupied Grey-headed Flying-fox camp at the Ku-ring-gai Flying Fox Reserve, Gordon.

Identified Threats to Fauna Values:

High: Habitat loss; habitat continuity within the site; fire frequency and intensity; water quality, particularly runoff from waste disposal areas, such as Belrose Waste Management Centre and stormwater run off since all of the watercourses originate inside urban areas; weed infestation; tree dieback; impacts associated with easements and road crossings; high edge effect particularly from housing encroachment on to fringing bushland areas; impacts associated with high public visitation in parts of the site, such as erosion; loss of hollow-bearing trees; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; disturbance of resting and young bats at the Grey-headed Flying-fox camp; loss of canopy trees at the Grey-headed Flying-fox camp; siltation of watercourses and tidal areas.

Moderate: Predation by feral predators (e.g. Black Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled dogs; predation by domestic cats; mangrove encroachment into backing wetlands; competition for hollows by feral Honeybees *Apis mellifera*; bush rock removal; entanglement in discarded fishing tackle.



The site is characterised by a high edge effect which has a significant impact on biodiversity values. M. Schulz/DECC



Interpretative signs have been erected in a number of important areas within the site. M. Schulz/DECC



Roads present major barriers for fauna both within the site and with adjacent conservation reserves. M. Schulz/DECC

Land Management:

The tenure of this site is complex. A large component of the site comprises Garigal NP. Much of the remainder of the site comprises crown and council reserves within the Ku-ring-gai, Manly, Warringah and Willoughby LGAs including the Dalrymple–Hay NR (managed by DECC), Clive Park, Sailors Bay Park, Harold Reid Reserve, Explosives Reserve, H.D. Robb Reserve, Manly Dam Reserve, Manly–Warringah War Memorial Park, Lindfield Soldiers Memorial Park, Seven Little Australians Park, Ku-ring-gai Flying Fox Reserve, East Gordon Park, Surgeon White Reserve and McIntosh Park. Other bushland areas are located on private land, and vegetated sections of Belrose Waste Management Centre and Wakehurst Golf Course. The maintenance of a continuous habitat link between the northern edge of the site and Ku-ring-gai NP in the St Ives area and the Narrabeen Lake section of Garigal NP are vital to maintain the current biodiversity values of the area, such as maintenance of the population of the endangered Southern Brown Bandicoot. However, Mona Vale Road and Forest Way respectively form major barriers to the movement of many species. Measures are required for these habitat links to be effective to allow fauna movements across these high traffic volume roadways.

References and Further Reading:

Basham (2005), Beck (2007), Benson & Howell (1995), Burton (2000, 2004), Burton & Hancock (2007), DEC (2006e), DECC (2007b), Ives *et al.* (2006), Kavanagh (2004), Keith (2004), Ku-ring-gai Council (1999, 2006), Larsen *et al.* (2002), Lindsay (2007), McDonald *et al.* (2002), McKay *et al.* (1999), McWilliam (1984), Morris (2000, 2007a, b), NSW National Parks and Wildlife Service (1998b,

2001c, 2004), Pallin (2000, 2007), Pennay *et al.* (2004), Warringah Council (2005a, b, c), White (2001, 2006a).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website, Birdline NSW; +4 – Burton (2004); +5 – White (2001); +6 - Kuring-gai Council Bio-base records; +7 – Pallin (2007); +8 – City of Willoughby records; +9 – Basham (2005); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records; DEC 2004); *2 – only recorded prior to 1997 (Burton 2004); *3 – only recorded prior to 1997 (McWilliam 1984).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	*1	V	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+5	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Freycinet's Frog <i>Litoria freycineti</i>	+2	P	RS
Peron's Tree Frog <i>Litoria peronii</i>	+5	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+5	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Burton's Legless-lizard <i>Lialis burtonis</i>	+5	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+2	V	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+5	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+2	P	
White's Rock-skink <i>Egernia whitii</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Weasel Shadenskink <i>Saproscincus mustelinus</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Eastern Brown Tree Snake <i>Boiga irregularis</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Green Tree Snake <i>Dendrelaphis punctulata</i>	+2	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+2	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Red-naped Snake <i>Furina diadema</i>	+2	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Mainland Tiger Snake <i>Notechis scutatus</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+5	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+2	P	RS
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+4	P	RS
King Quail <i>Coturnix chinensis</i>	*2	P	RS
Australian Brush-turkey <i>Alectura lathami</i>	+1	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Mallard <i>Anas platyrhynchos</i>	+4	U	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+4	P	
Darter <i>Anhinga melanogaster</i>	+4	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+4	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+2	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+2	P	
Little Egret <i>Egretta garzetta</i>	+3	P	
White-necked Heron <i>Ardea pacifica</i>	+4	P	
Great Egret <i>Ardea alba</i>	+4	P	RS
Cattle Egret <i>Ardea ibis</i>	+5	P	
Striated Heron <i>Butorides striatus</i>	+4	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+4	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+4	V	
Australian White Ibis <i>Threskiornis molucca</i>	+4	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+4	P	
Royal Spoonbill <i>Platalea regia</i>	+4	P	
Osprey <i>Pandion haliaetus</i>	+2	V	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+4	P	
Black Kite <i>Milvus migrans</i>	+4	P	
Whistling Kite <i>Haliastur sphenurus</i>	+4	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+2	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	

Species	Status	Legal Status	Regional Status
Wedge-tailed Eagle <i>Aquila audax</i>	+4	P	RS
Little Eagle <i>Hieraetus morphnoides</i>	+4	P	RS
Brown Falcon <i>Falco berigora</i>	+4	P	
Australian Hobby <i>Falco longipennis</i>	+4	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+4	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+4	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	*1	P	RS
Dusky Moorhen <i>Gallinula tenebrosa</i>	+4	P	
Painted Button-quail <i>Turnix varia</i>	+2	P	RS
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+2	P	
Crested Tern <i>Sterna bergii</i>	+4	P	
Rock Dove <i>Columba livia</i>	+4	U	
White-headed Pigeon <i>Columba leucomela</i>	+2	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+2	P	RS
Emerald Dove <i>Chalcophaps indica</i>	+4	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	+2	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+2	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+4	P	RS
Wompoo Fruit-Dove <i>Ptilinopus magnificus</i>	+4	V	
Superb Fruit-Dove <i>Ptilinopus superbus</i>	+2	V	
Rose-crowned Fruit-Dove <i>Ptilinopus regina</i>	+2	V	
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+4	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+2	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+2	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+4	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+2	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+4	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Swift Parrot <i>Lathamus discolor</i>	+3	E1	
Red-rumped Parrot <i>Psephotus haematotus</i>	+2	P	
Oriental Cuckoo <i>Cuculus saturatus</i>	+2	P	RS
Pallid Cuckoo <i>Cuculus pallidus</i>	*2	P	

Species	Status	Legal Status	Regional Status
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+4	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+4	P	RS
Powerful Owl <i>Ninox strenua</i>	+2	V	
Barking Owl <i>Ninox connivens</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+2	P	
Sooty Owl <i>Tyto tenebricosa</i>	+5	V	
Masked Owl <i>Tyto novaehollandiae</i>	+3	V	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+2	P	
Fork-tailed Swift <i>Apus pacificus</i>	+7	P	
Azure Kingfisher <i>Alcedo azurea</i>	+4	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+2	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	*2	P	Locally extinct
Spotted Pardalote <i>Pardalotus punctatus</i>	+2	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
Eastern Bristlebird <i>Dasyornis brachypterus</i>	*2	E1	Locally extinct
Rockwarbler <i>Origma solitaria</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	+7	P	RS
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+4	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	

Species	Status	Legal Status	Regional Status
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+4	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+4	P	RS
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+4	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
White-fronted Chat <i>Epthianura albifrons</i>	*2	P	RS
Jacky Winter <i>Microeca fascinans</i>	*2	P	RS
Scarlet Robin <i>Petroica boodang</i>	*2	P	RS
Flame Robin <i>Petroica phoenicea</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Spectacled Monarch <i>Monarcha trivirgatus</i>	+3	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+4	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+4	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+2	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+2	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+4	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+3	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+6	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+2	P	
Australian Raven <i>Corvus coronoides</i>	+2	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	+5	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	
Australian Pipit <i>Anthus australis</i>	*2	P	RS
House Sparrow <i>Passer domesticus</i>	+2	U	
Zebra Finch <i>Taeniopygia guttata</i>	*2	P	RS
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	*2	P	RS

Species	Status	Legal Status	Regional Status
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Tree Martin <i>Petrochelidon nigricans</i>	+6	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Golden-headed Cisticola <i>Cisticola exilis</i>	+4	P	RS
Silvereye <i>Zosterops lateralis</i>	+2	P	
Bassian Thrush <i>Zoothera lunulata</i>	+2	P	RS
Common Starling <i>Sturnus vulgaris</i>	+4	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	*1	V	
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Southern Brown Bandicoot <i>Isodon obesulus</i>	+2	E1	
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+2	V	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
Little Red Flying-fox <i>Pteropus scapulatus</i>	*3	P	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+9	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+9	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+9	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+9	V	Unconfirmed
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+7	P	
House Mouse <i>Mus musculus</i>	+2	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Brown Rat <i>Rattus norvegicus</i>	+8	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 7: LOWER GEORGES RIVER

Location:

Lower Georges River and fringing bushland from the Picnic Point area downstream to Como Bridge at the mouth of the Woronora River, including Georges River NP and Oatley Park (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Bankstown, Hurstville and Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	509	44
Crown Land	65	6
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	572	50
Total	1146	100

Environmental Setting:



Exposed intertidal mudflats on Georges River provides important feeding habitat for shorebirds. M. Schulz/DECC



The freshwater wetland forming Yeramba Lagoon is important for a wide variety of waterbirds. M. Schulz/DECC



Extensive sedgeland backed by Swamp Oak forest occurs behind some mangrove areas. M. Schulz/DECC

The site is characterised by the deeply incised valleys of the Georges River and lower sections of Boggyswell, Little Salt Pan and Mill Creeks. These watercourses are fringed predominantly by urban development on the valley crests and upper ridges; although in places houses have been developed down to the waterline, such as in the Lugarno–Oatley areas. The site is characterised by steep slopes on Hawkesbury Sandstone merging upslope to gently undulating terrain of the plateau crest. A variable band of Quaternary marine sediments occurs along the edge of the Georges River and its lower tributaries, including some extensive areas supporting intertidal mudflats, mangroves and coastal saltmarsh (a listed endangered ecological community under the TSC Act 1995). Vegetation is dominated by communities associated with low fertility Hawkesbury Sandstone, including western sandstone gully forest, Upper Georges River sandstone woodland and patches of shale sandstone transition forest. Stands of Swamp Oak *Casuarina glauca* forest and alluvial woodland and forest (including Forest Red Gum *Eucalyptus tereticornis* and Swamp Mahogany *E. robusta*) occur on low-lying ground adjacent to watercourses and around parts of Yeramba Lagoon. Freshwater wetlands are best developed at Yeramba Lagoon and occur behind some coastal saltmarshes, such as adjacent to Mill Creek. A small patch of gully rainforest occurs on a southerly facing slope of Great Moon Bay. The site suffers from edge effects due the high boundary to area ratio with adjacent urban areas and sections have a high fire frequency that exceeds the thresholds for many flora and fauna communities (NSW National Parks and Wildlife Service 2001h). Additionally, it has a high level of public visitation, particularly along the Georges River and around established picnic areas and other facilities. The site is connected to bushland in Holsworthy Military Reserve and Heathcote NP in the Mill Creek – Alford Point area. The site supports five priority fauna habitats: forested wetland, rainforest, alluvial forest and woodland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports a diverse assemblage of Hawkesbury Sandstone woodland and riverine fauna, including providing feeding habitat for an endangered shorebird community and habitat for a number of threatened species such as the Green and Golden Bell Frog, Pied Oystercatcher, Powerful Owl and Koala, and a variety of regionally significant species.



Tyler's Tree Frog is common around Yeramba Lagoon. M. Schulz



The White-bellied Sea-Eagle nests within the site. M. Schulz



The cryptic Little Grassbird is more often heard than seen in reeds and sedges around Yeramba Lagoon and other wetland areas. M. Schulz

Priority Fauna Species Review:

There have been 222 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 166 birds, 23 reptiles, 21 mammals and 12 frogs. Of these two are considered endangered (excluding vagrant and unconfirmed species), eight as vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further 46 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2004 (Atlas record)	Crown	Status uncertain. Observed in April 2004 southwest of Sandy Point (Atlas of NSW Wildlife record). Individuals present within the site may form part of the Hammondville population (DEC 2005b).
Freckled Duck	Vulnerable	2002 (McKay 2002)	Crown: DECC	Rare drought visitor; the most recent record being of one female at Yeramba Lagoon in Aug 2002 (McKay 2002).
Black-necked Stork (Jabiru) (VAGRANT)	Endangered	2006 (Atlas record)	Crown: NSW Maritime	Vagrant to the Sydney Basin Bioregion (Hoskin <i>et al.</i> 1991). A single individual observed on tidal flats of the Georges River in the Illawong Point–Oatley Bay area in Feb 2006 (Atlas of NSW Wildlife record; D. Andrew, DECC, pers. comm.).
Osprey	Vulnerable	2007 (Current study)	Widespread	Uncommon visitor. Regularly observed in 2007, with two individuals present in Aug 2007 (D. Andrew, DECC, pers. comm.).

Species	Threat Category*	Last Recorded	Tenure	Comments
Square-tailed Kite	Vulnerable	2007 (Atlas record)	Crown; Hurstville Council	Rare visitor, recorded several times from Oatley Park, such as in Aug 2004 (Russill & Russill 2004a) and Jan 2007 (D. Andrew, DECC, pers comm.).
Pied Oystercatcher	Vulnerable	2007 (Current study)	Crown: NSW Maritime	Regularly observed foraging on exposed tidal flats of the Georges River in the Illawong Point–Oatley Bay area (D. Andrew, DECC, pers. comm.).
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown: NSW Maritime	Regularly used as a foraging site by small number (<50) of individuals from this community, particularly the Pied Oystercatcher, Eastern Curlew and Bar-tailed Godwit (D. Andrew, DECC, pers. comm.). These birds primarily feed on the intertidal mudflats along the lower reaches of the Georges River within the site, particularly in the Illawong Point–Oatley Bay area
**Gang-gang Cockatoo	Vulnerable	Undated (J. & N. Russill, pers. comm.)	Hurstville Council	Not seen in recent years in Oatley Park (J. & N. Russill, pers. comm.).
Powerful Owl	Vulnerable	2007 (Current study)	Widespread	Scattered records, including from Griffins Point area, Oatley Park, Boomerang Reserve adjacent to Little Salt Pan Creek and Georges River NP (Atlas of NSW Wildlife records; Current study).
Regent Honeyeater	Endangered	2000 (Atlas record)	Uncertain	Very rare visitor. The only documented recent record is of two birds in the Edith Bay area, Lugarno in May 2000 (Atlas of NSW Wildlife record).
Black-chinned Honeyeater (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Uncertain	Status uncertain. An Atlas of NSW Wildlife record with the grid reference from the Yeramba Lagoon area had as a locality description “Moorebank Brickworks”. Therefore, this sighting locality is probably erroneous.
**Pink Robin	Vulnerable	1972 (Hoskin <i>et al.</i> 1991)	Crown: DECC	One seen at Yeramba Lagoon in Aug 1972 (Hoskin <i>et al.</i> 1991). A rare winter migrant to the Sydney region.
Koala	Vulnerable	2005 (Atlas record)	Crown: DECC; Hurstville Council; private	Scattered records principally on the southern side of Georges River southeast of Sandy Point and extending east to the Georges River NP (Atlas of NSW Wildlife records).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	This species forages widely across the site when suitable trees and shrubs are in flower or fruit. A small camp has recently established at Miles Dunphy Reserve in Oatley (D. Andrew, DECC, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2005 (D. Andrew, DECC, pers. comm.)	Widespread foraging habitat	Recorded by Anabat detector from the Jewfish Point–Oatley Park areas (D. Andrew, DECC, unpublished records). There are no known roosts within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: Tidal flats on the Georges River are regularly used as a foraging site by small numbers of the migratory shorebirds; shallows on the edge of Yeramba Lagoon occasionally used by shorebirds (i.e. Latham's Snipe); a recently occupied Grey-headed Flying-fox camp.

Identified Threats to Fauna Values:

High: Habitat discontinuity within parts of the site, particularly where houses front the river, such as in the Lugarno area; habitat loss in lands currently linking the site to Holsworthy Military Reserve; water quality, including from the Regional Waste Disposal Depot in the Mill Creek catchment; increased sedimentation; disturbance to wildlife and bank erosion by watercraft and widespread access along the banks of the river; fire frequency and extent; weed infestation; erosion; mangrove encroachment on to intertidal flats and saltmarsh; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Housing encroachment on to fringing bushland areas; habitat degradation by trail bikes and off-road vehicles; tree dieback; disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Black Rat, Brown Rat, Fox, Feral Dog and Feral Cat); predation by domestic cats; bush rock removal; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping.



The site is bisected by a number of easements and roads, such as Alford's Point Road. M. Schulz/DECC



Boats are a major source of disturbance to waterbirds within the site. M. Schulz/DECC



Vegetation fringing the Georges River is discontinuous in sections of the site. M. Schulz/DECC

Land Management:

The tenure of this site is complex. It includes all of the Georges River NP and a number of council reserves, including Lambeth Reserve, Boomerang Reserve and Oatley Park. Sections of land fronting on to the Georges River are privately owned, such as in the Lugarno and Oatley areas. There are a number of roads and easements bisecting the site, the latter managed by a variety of companies and government agencies.

References and Further Reading:

Bankstown City Council (2002b), DEC (2005b), Fairley & Waterhouse (2005), Keith (2004), McKay (2002), National Parks Association of NSW (1992), NSW National Parks and Wildlife Service (1998, 2001c, d, h), NSW Scientific Committee (1998), Oatley Flora & Fauna Conservation Society (2003), Russill & Russill (2004a).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – D. Andrew, DECC, unpublished records; +5 – Fairley & Waterhouse (2005); +6 – Oatley Park birdlist; unpublished (J. & N. Russill); +7 – Bushland staff, Oatley Park, pers. comm.; * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 - only recorded prior to 1997 (NSW National Parks and Wildlife Service 1994); *3 – only recorded prior to 1997 (Fairley & Waterhouse (2005)); *4 - only recorded prior to 1997 (Hoskin *et al.* 1991); *5 - . only recorded prior to 1997, unpublished records (J. & N.. Russill); *6 – only recorded prior to 1997 (Oatley Flora and Fauna Conservation Society 2003).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Green Tree Frog <i>Litoria caerulea</i>	+4	P	RS
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Freycinet's Frog <i>Litoria freycineti</i>	+2	P	RS
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+2	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*6	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Southern Scaly-foot <i>Pygopus lepidopodus</i>	*6	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Lace Monitor <i>Varanus varius</i>	+7	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+4	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+4	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+4	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+4	P	RS
Eastern Brown Tree Snake <i>Boiga irregularis</i>	*6	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+4	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Red-naped Snake <i>Furina diadema</i>	+2	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+4	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	*1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+6	P	RS

Species	Status	Legal Status	Regional Status
Musk Duck <i>Biziura lobata</i>	+2	P	RS
Freckled Duck <i>Stictonetta naevosa</i>	+3	V	
Black Swan <i>Cygnus atratus</i>	+6	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchotis</i>	+1	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+6	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+2	P	RS
White-necked Heron <i>Ardea pacifica</i>	*5	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+4	P	
Cattle Egret <i>Ardea ibis</i>	+5	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	*3	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Black-necked Stork (Jabiru) <i>Ephippiorhynchus asiaticus</i>	+2	E1	
Osprey <i>Pandion haliaetus</i>	+1	V	
Black-shouldered Kite <i>Elanus axillaris</i>	*6	P	
Pacific Baza <i>Aviceda subcristata</i>	+4	P	RS
Square-tailed Kite <i>Lophoictinia isura</i>	+2	V	
Whistling Kite <i>Haliastur sphenurus</i>	+2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+5	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+4	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+4	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Little Eagle <i>Hieraaetus morphnoides</i>	*5	P	RS
Brown Falcon <i>Falco berigora</i>	*6	P	
Australian Hobby <i>Falco longipennis</i>	+4	P	

Species	Status	Legal Status	Regional Status
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	*6	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+2	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+2	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	*6	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	+3	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Whimbrel <i>Numenius phaeopus</i>	+2	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+1	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+4	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	+2	P	
Black-fronted Dotterel <i>Elseyornis melanops</i>	+5	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+4	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Gull-billed Tern <i>Sterna nilotica</i>	*4	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Common Tern <i>Sterna hirundo</i>	+4	P	RS
Crested Tern <i>Sterna bergii</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	+2	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+4	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	*5	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+6	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Cockatiel <i>Nymphicus hollandicus</i>	+2	P	Escapee?
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+6	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	*6	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Oriental Cuckoo <i>Cuculus saturatus</i>	*1	P	RS
Pallid Cuckoo <i>Cuculus pallidus</i>	+6	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	*6	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+6	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+4	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+4	P	
Fork-tailed Swift <i>Apus pacificus</i>	*6	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+2	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+6	P	
Rockwarbler <i>Origma solitaria</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+5	P	RS
Weebill <i>Smicronis brevirostris</i>	+6	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	*6	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+4	P	
Striated Thornbill <i>Acanthiza lineata</i>	+6	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	+2	E1	
Bell Miner <i>Manorina melanophrys</i>	+3	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	+2	V	Unconfirmed
White-naped Honeyeater <i>Melithreptus lunatus</i>	+3	P	
Brown Honeyeater <i>Lichmera indistincta</i>	*5	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+2	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+3	P	
Jacky Winter <i>Microeca fascinans</i>	*6	P	RS
Scarlet Robin <i>Petroica boodang</i>	*6	P	RS
Pink Robin <i>Petroica rodinogaster</i>	*4	V	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+6	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+4	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+3	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+4	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+4	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Cicadabird <i>Coracina tenuirostris</i>	*6	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+6	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+2	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+3	P	
Australian Pipit <i>Anthus australis</i>	*6	P	RS
House Sparrow <i>Passer domesticus</i>	+6	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	*5	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	*5	U	
European Goldfinch <i>Carduelis carduelis</i>	*6	U	

Species	Status	Legal Status	Regional Status
Mistletoebird <i>Dicaeum hirundinaceum</i>	+6	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+6	P	
Fairy Martin <i>Petrochelidon ariel</i>	+6	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+4	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+2	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinobus gouldii</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+4	V	
Long-eared Bat <i>Nyctophilus</i> sp.	+1	P	
House Mouse <i>Mus musculus</i>	+4	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+4	U	
Brown Rat <i>Rattus norvegicus</i>	+4	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+4	U	
Rabbit <i>Oryctolagus cuniculus</i>	*2	U	
Brown Hare <i>Lepus capensis</i>	+2	U	

Site 8: KURNELL

Location:

Kurnell Peninsula south of Captain Cook Drive extending westwards from the boundary of Botany Bay NP to the western end of Lucas Reserve and Cronulla High School (refer to Map i).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	207	40
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	309	60
Total	516	100

Environmental Setting:



High quality heathland on Caltex Oil Refinery land. M. Schulz/DECC



Boat Harbour and Merries Reef, important shorebird habitat. M. Schulz/DECC



Pondage and adjoining Kurnell Dune Forest, Cronulla Sewerage Treatment Plant. M. Schulz/DECC

The site comprises the southern section of the Kurnell Peninsula. This area consists of a sand spit that links the Hawkesbury Sandstone bedrock of Botany Bay NP to the east and other bedrocks on the inland side (Sutherland Shire Environment Centre 2004). The site is characterised by gently undulating to rolling coastal dunefields and relict dunes, with the highest dunes being Connell Hill in the Charlotte Breen Memorial Reserve and Calsil Dune east of the Carbide Plant. Vegetation is diverse, including stands of littoral rainforest, freshwater wetland, coastal heathland including Kurnell Dune Forest (an endangered ecological community) and extensive disturbed areas dominated by Bitou Bush *Chrysanthemoides monilifera*. The area has been extensively sand mined and most of the original vegetation has been cleared as a result of mining and past grazing, cultivation and forestry activities. The majority of the area is privately owned and includes land owned by Caltex Oil Refinery and an associated carbon black manufacturing plant. Other sections of land are either currently being developed (such as the Australand development and the construction of the desalination plant) or under development applications. Cronulla Beach and Boat Harbour are heavily used by the public and 4WD vehicles use the shoreline east of Lucas Reserve. Only tenuous continuous habitat links across private land connect this site with Towra Point NR and Botany Bay NP. The site supports four priority fauna habitats: forested wetland, rainforest, freshwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Low

Fauna Overview: This site supports a range of threatened and regionally uncommon waders, waterbirds, frogs and other species; notably it encompasses the majority of area occupied by the Kurnell population of the endangered Green and Golden Bell Frog, supports a large seasonal Grey-headed Flying-fox camp and provides important roosting habitat for migratory shorebirds including a number of threatened species and the endangered Little Tern.



This site is important for the Green and Golden Bell Frog. S. Cohen/NPWS



A seasonally occupied Grey-headed Flying-fox camp occurs within the site. M. Schulz/DECC



The Boat Harbour area supports some of the highest numbers of Sooty Oystercatchers within the CMA. M. Schulz

Priority Fauna Species Review:

There have been 166 vertebrate fauna species (excluding fish, marine species, vagrants and escapees) documented within this area in the last 10 years: 125 birds, 15 reptiles, 15 mammals and 11 frogs. Of these two are considered endangered (excluding vagrants and unconfirmed species), nine as vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further 40 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Wallum Froglet	Vulnerable	1999 (Atlas record)	Widespread	Recorded from Calsil Dune area (Atlas of NSW Wildlife record). Also records from Big Swamp and other wetlands south of the Carbide Plant and the Caltex Oil Refinery (Australian Museum Business Services 1997).
Green and Golden Bell Frog	Endangered	2007 (Current study)	Widespread	This site supports the majority of the Kurnell key population of the species and is the second largest population in the CMA (DECC 2007). Recorded from a number of freshwater lagoons in the area, such as on land owned and being developed by Australand (Atlas of NSW Wildlife records). Also present in Keegans Pond, Cronulla Sewerage Treatment Works; Calsil Dune area and other wetlands south of the Carbide Plant and the Caltex Oil Refinery.
Australasian Bittern	Vulnerable	2007 (Current study)	Crown: Sydney Water	A single individual was flushed at Keegans Pond in Cronulla Sewerage Treatment Works in Mar 2007 (Current study). An earlier record from Boat Harbour in July 1990 (Atlas of NSW Wildlife record) and Kurnell in 1940 (Morris 1989). Probably an occasional visitor to wetlands in the area.
Sanderling	Vulnerable	2007 (Birdline NSW record)	Crown: DPI; Sutherland Shire	Occasional records of up to 10 individuals from Boat Harbour, Merries Reef and Bate Bay (Atlas of NSW records; Birding-aus and Birdline NSW records). Prior to 1970 regularly present but since then

Species	Threat Category*	Last Recorded	Tenure	Comments
				present much more irregularly and in smaller numbers (Morris 1989).
**Great Knot	Vulnerable	1950 (Atlas record)	Crown: DPI; Sutherland Shire	Three individuals recorded at Boat Harbour in Jan 1950 (Atlas of NSW Wildlife record; Morris 1989). Likely to be a rare summer visitor to Boat Harbour and Merries Reef.
** Broad-billed Sandpiper	Vulnerable	1950 (Atlas record)	Crown: DPI; Sutherland Shire	The only record is from Boat Harbour in Jan 1950 (Atlas of NSW Wildlife record). Likely to be only a vagrant to the site.
Beach Stone-curlew (VAGRANT)	Endangered	2004 (Jones 2004)	Crown: DPI; Sutherland Shire	Vagrant to the Sydney Basin Bioregion, with the only record being of a single individual in Feb 2004 (Jones 2004).
Sooty Oystercatcher	Vulnerable	2007 (Current study)	Crown: DPI; Sutherland Shire	Up to 23 birds recorded on Boat Harbour and Merries Reefs (NSW Wader Study Group count data). Also present on the rocky shoreline and exposed reef platforms east to Botany Bay NP. Occasionally visits inland wetlands in the site (Atlas of NSW Wildlife records).
Pied Oystercatcher	Vulnerable	2007 (Madvig 2007)	Crown: DPI; Sutherland Shire	An occasional visitor to Boat Harbour, Merries Reef and Bate Bay (e.g. Madvig 2007). No nesting records.
Greater Sand Plover	Vulnerable	2007 (Birdline NSW record)	Crown: DPI; Sutherland Shire	A rare visitor to Boat Harbour and Merries Reefs (Blanchflower 2004; Morris 1989; Atlas of NSW Wildlife records).
Lesser Sand Plover	Vulnerable	2007 (Current study)	Crown: DPI; Sutherland Shire	Occasional visitor to Boat Harbour and Merries Reefs. Maximum number recorded: 38 individuals in Mar 1992 (Atlas of NSW Wildlife record). Numbers are decreasing.
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown: DPI; Sutherland Shire	Individuals from this community use the Boat Harbour/Merries Reef area to roost and feed.
Little Tern	Endangered	2003 (Atlas record)	Crown: DPI; Sutherland Shire	Occasionally seen resting on exposed rocks at Boat Harbour and Merries Reefs. Maximum numbers recorded in the last 10 years was 40 individuals and prior to this period 200 individuals in Oct 1977 (Atlas of NSW Wildlife records). No recent nesting records. Up until the late 1950s four or five pairs nested on a sandspit at Boat Harbour (O'Sullivan <i>et al.</i> 2001).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Sydney Water	A seasonally occupied camp (spring to autumn) in Swamp Oak Floodplain Forest in the desalination plant site owned by Sydney Water. Up to 9700 individuals were recorded exiting from this camp in early Mar 2007 (P. Eby, flying-fox consultant, pers. comm.). Forages extensively on Coast Banksia <i>Banksia integrifolia</i> in Kurnell Dune Forest throughout the site, such as in Mar 2007 (current study).
Eastern Bentwing-bat	Vulnerable	1997 (Atlas record)	Widespread foraging habitat	Only identified from ultrasonic calls recorded from Calsil Dune in the eastern part of the site (Current study; Atlas of NSW Wildlife record; LesryK

Species	Threat Category*	Last Recorded	Tenure	Comments
				Environmental Consultants 1997b). No known roosts in the site. This species may range into the site from roosts suspected to occur in the sea cliffs of Botany Bay NP or on the north side of Botany Bay entrance.
Southern Myotis (UNCONFIRMED)	Vulnerable	2007 (Current study)	Uncertain	Identified from ultrasonic calls recorded from Calsil Dune in the eastern part of the site (Current study; Atlas of NSW Wildlife record). The ultrasonic signals of this bat are readily confused with the more common long-eared bats (e.g. Pennay <i>et al.</i> 2004; L. Lumsden, Arthur Rylah Institute, Victoria, pers. comm.). Therefore, until individuals are trapped this species must be regarded as unconfirmed within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: Regular seasonally occupied Grey-headed Flying-fox camp; minor migratory shorebird roost and feeding location in the Boat Harbour–Merries Reef area. *Note:* The Red-capped Plover formerly nested at Boat Harbour between 1948 and 1953 (Morris 1989).

Identified Threats to Fauna Values:

High: Habitat loss due to sand mining and industrial development; loss of continuous habitat links with nearby conservation reserves; disturbance, particularly in the Boat Harbour area, due to high public visitation, including from 4WD vehicles and dogs; fauna habitat discontinuity; weed infestation and associated management practices; water quality in freshwater wetlands; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); impacts of fire; entanglement in discarded fishing tackle.



Green and Golden Bell Frog holding ponds, Australand, Kurnell. M. Schulz/DECC



Much of the vegetation within the site is degraded and weed infested. M. Schulz/DECC



A marginal habitat link currently exists between Towra Point NR and Botany Bay NP through the site. M. Schulz/DECC

Land Management:

Complex. There are a multitude of land owners and managers found within and adjoining the site, including Sydney Water, Sutherland Shire Council which manages a number of reserves; and private land owners. The intertidal zone in the Boat Harbour – Merries Reef area is managed by DPI Fisheries as part of the Boat Harbour Aquatic Reserve (NSW DPI Fisheries 2007c). Any work in relation to shorebirds within this area will require a cooperative approach to managing the site, in conjunction with other migratory shorebird/waterbird sites in the Botany Bay/lower Georges River area such as those used by Endangered Ecological Shorebird community occurring on the relict tidal delta sands of Botany Bay. Management is perhaps best served by the development of an overall plan of management.

References and Further Reading:

Australian Museum Business Services (1997), Biosis Research (2002), Blanchflower (2004), Corkery and Co. Pty Ltd (2004), DEC (2005b), DECC (2007), Geering *et al.* (2007), Gunninah Environmental Consultants (1999, 2000), Jones (2004), Keith (2004), LesryK Environmental Consultants (1996, 1997a, 1997b), Madvig (2007), Morris (1989), NSW DPI Fisheries (2007c), NSW National Parks and Wildlife Service (2001c, 2002a), NSW Scientific Committee (1998), O'Sullivan *et al.* (2001), Pennay *et al.* (2004), Straw (2005), Sutherland Shire (2000), Sutherland Shire Environment Centre (2004), Urban Bushland Management Consultants (2006a, b).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife & Birdline NSW; +3 – M. Hills, Cronulla Sewerage Treatment Plant pers. comm.; +4 – Gunninah Environmental Consultants (1999); +5 – LesryK Environmental Consultants (1996); +6 – LesryK Environmental Consultants (1997b); +7 – Records from various observers posted on the Birding-aus website & Birdline NSW; +8 – NSW Wader Study Group records; +9 – G. Madani, DECC, pers. comm.; * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Australian Museum Business Services 1996); *2 – only recorded prior to 1997 (Morris 1989).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Wallum Froglet <i>Crinia tinnula</i>	+2	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Marsh Frog <i>Limnodynastes tasmaniensis</i>	*1	P	
Haswell's Froglet <i>Paracrinia haswelli</i>	+4	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+1	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+4	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Jervis Bay Tree Frog <i>Litoria jervisiensis</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+2	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	*	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+2	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+6	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+6	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Yellow-faced Whipsnake <i>Demansia psammophis</i>	+6	P	

Species	Status	Legal Status	Regional Status
Marsh Snake <i>Hemiaspis signata</i>	+4	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+3	P	
Birds:			
Stubble Quail <i>Coturnix pectoralis</i>	*	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Musk Duck <i>Biziura lobata</i>	+2	P	RS
Black Swan <i>Cygnus atratus</i>	+2	P	
Australian Shelduck <i>Tadorna tadornoides</i>	*	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+4	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+4	P	
Cattle Egret <i>Ardea ibis</i>	*2	P	
Striated Heron <i>Butorides striatus</i>	+8	P	
Australasian Bittern <i>Botaurus poiciloptilus</i>	+1	V	
Glossy Ibis <i>Plegadis falcinellus</i>	*2	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+2	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	*2	P	RS
Brown Falcon <i>Falco berigora</i>	+2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	*2	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	

Species	Status	Legal Status	Regional Status
Painted Button-quail <i>Turnix varia</i>	*	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	*2	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+2	P	RS
Whimbrel <i>Numenius phaeopus</i>	+8	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+2	P	RS
Common Greenshank <i>Tringa nebularia</i>	+2	P	RS
Wood Sandpiper <i>Tringa glareola</i>	*2	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+8	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+1	P	RS
Wandering Tattler <i>Heteroscelus incanus</i>	+2	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+1	P	RS
Great Knot <i>Calidris tenuirostris</i>	*	V	
Red Knot <i>Calidris canutus</i>	+2	P	RS
Sanderling <i>Calidris alba</i>	+2	V	
Red-necked Stint <i>Calidris ruficollis</i>	+1	P	RS
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+8	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	+7	P	RS
Broad-billed Sandpiper <i>Limicola falcinellus</i>	*	V	
Beach Stone-curlew <i>Esacus neglectus</i>	+2	E1	
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	+2	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+1	P	RS
Grey Plover <i>Pluvialis squatarola</i>	+8	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	+7	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Lesser Sand Plover <i>Charadrius mongolus</i>	+1	V	
Greater Sand Plover <i>Charadrius leschenaultii</i>	+7	V	
Black-fronted Dotterel <i>Elseyaornis melanops</i>	+2	P	
Masked Lapwing <i>Vanellus miles</i>	+3	P	
Pacific Gull <i>Larus pacificus</i>	*	P	
Kelp Gull <i>Larus dominicanus</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	*	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	+7	P	
Common Tern <i>Sterna hirundo</i>	+7	P	RS
Arctic Tern <i>Sterna paradisaea</i>	*	P	
Little Tern <i>Sterna albifrons</i>	+2	E1	
Fairy Tern <i>Sterna nereis</i>	*	P	
Whiskered Tern <i>Chlidonias hybridus</i>	*	P	RS
White-winged Black Tern <i>Chlidonias leucopterus</i>	+7	P	RS
Rock Dove <i>Columba livia</i>	+2	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	

Species	Status	Legal Status	Regional Status
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	*	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	*	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+5	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	*	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	*2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+4	P	RS
Barn Owl <i>Tyto alba</i>	*	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+5	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	*2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	*2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	*2	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+1	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	*	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	*2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	*2	P	
White-fronted Chat <i>Epthianura albifrons</i>	*2	P	RS
Scarlet Robin <i>Petroica boodang</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	*2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+6	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	*2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	*2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	*2	P	

Species	Status	Legal Status	Regional Status
Leaden Flycatcher <i>Myiagra rubecula</i>	*2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+9	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+4	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+2	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Brown Songlark <i>Cinclorhamphus cruralis</i>	*	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	Unconfirmed
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 9: SYDNEY OLYMPIC PARK

Location:

Sydney Olympic Park, including Newington NR, Haslams Creek and Bicentennial Park (refer to Map i).

Relative Area Size in CMA:

Medium

Sub-catchment:

Parramatta River

Local Government Area:

Auburn and Canada Bay

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	47	11
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	378	89
Total	425	100

Environmental Setting:



Wetlands in Sydney Olympic Park provide habitat for a variety of waterbirds. M. Schulz/DECC



Extensive mangrove areas occur in Newington NR and Badu Mangroves. M. Schulz/DECC



Remnant Sydney Turpentine-Ironbark forest, Newington NR. M. Schulz/DECC

Sydney Olympic Parklands, including Newington NR are located on the southern side of the Parramatta River, approximately 15 km west of Sydney. The site is situated adjacent to the sporting venues and urban core of Sydney Olympic Park. Bicentennial Park was opened in 1988 to commemorate the Bicentenary of European settlement of Australia, and much of the remaining area (excluding Newington NR) was remediated between 1996 and 2000 in preparation for the Sydney Olympics held in 2000. Remnant habitat is largely restricted to the Newington NR, where significant areas of saltmarsh and mangroves representing the only remaining example in the Parramatta River estuary of a complete estuarine zonation grading from Cumberland Plain Woodland through to Swamp Oak *Casuarina glauca* forest to saltmarsh to mangroves. The site has been substantially altered due to past land uses, including sections used as the Newington Royal Australian Navy Armament Depot between 1897 and 1999; and other parts used as a clay quarry, brickworks and contaminated landfill areas, such as Newington East Landfill. In the 1960s and 1970s extensive reclamation works using much of Sydney's household, commercial and industrial waste resulted in the infilling of parts of Homebush Bay. The low-lying nature of the area on level to gently undulating alluvial floodplains draining Wianamatta Group shales has resulted in a diverse range of remnant habitats, including a number of endangered ecological communities, such as coastal saltmarsh, Swamp Oak Floodplain Forest and remnant Sydney Turpentine-Ironbark forest. Two main watercourses occur; Haslams and Powell's Creeks with associated wetlands such as Narawang and Nuwi Wetlands. Many wetlands in the site have been artificially created or modified, such as those in the Brickpit, Wentworth Common, Haslams Creek flats and Narawang Wetland. For example, the last area was once part of extensive saltmarsh and intertidal mudflats on Wentworth Bay that was landfilled for industrial use and then remediated. Parts of the Parklands have restricted access, such as Newington NR and the Brickpit, while a system of trails and boardwalks traverses other parts of the site. A number of viewing platforms and a bird hide are located within the Badu Wetlands. Remnant and recreated habitats are interspersed with mown grassland, public use areas and roads.

A large amount of habitat remediation and bush regeneration has been undertaken within the area, including the extensive replanting of local native species. Tree hollows are largely restricted to forest in Newington NR, with scattered hollows in some larger Grey Mangroves, supplemented by nest boxes erected in other parts of the site. The Parklands are connected by a discontinuous and variable width band of mangroves and other vegetation to council reserves along the Parramatta River. The site supports four priority fauna habitats: forested wetland, grassy woodland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a diverse array of wetland, estuarine and remnant woodland fauna, some of which are uncommon within the CMA; including the largest and most secure population of the endangered Green and Golden Bell Frog; the only site in which the Red-kneed Dotterel and Red-necked Avocet are regularly recorded; one of only two sites within the region supporting a population of the declining and regionally significant White-fronted Chat; provides habitat for a range of migratory shorebirds, and is one of the only known White-striped Freetail-bat maternity roosts within the CMA.



The Black-winged Stilt is a common shorebird that nests within the site. M. Schulz/DECC



Wetlands in the site are the only location in the CMA where the Red-kneed Dotterel is regularly seen. M. Schulz



Occasionally rare waterbirds are observed in the wetlands, such as the Australian Shelduck. M. Schulz

Priority Fauna Species Review:

There have been 237 vertebrate fauna species (excluding fish, vagrants and escapees) documented within this area in the last 10 years: 199 birds, 18 mammals, 13 reptiles and seven frogs. Of these one is considered endangered (excluding vagrants and unconfirmed species) and five as vulnerable (these are discussed below). A further 59 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2007 (NSW Wildlife Atlas record)	Crown: SOPA	A large population is present, estimated at over 1500 individuals (AMBS 2002a). This key population is considered the most secure in the Sydney region (DEC 2005b). Recent monitoring indicates that the population is relatively stable (K. Darcovich, SOPA, pers comm.). This population has been the subject of intense active management, including the construction of artificial 'frog' ponds, frog fences and frog underpasses.

Species	Threat Category*	Last Recorded	Tenure	Comments
**Freckled Duck	Vulnerable	1985 (Morris <i>et al.</i> 1990)	Crown: SOPA	Very rare visitor with no recent documented records. One bird present on Homebush Bay in Nov 1985 (Morris <i>et al.</i> 1990).
Australasian Bittern	Vulnerable	2006 (SOPA 2007b)	Crown: SOPA	Individuals periodically seen within Narawang Wetland over the past five years (SOPA 2007b).
Osprey	Vulnerable	2004 (NSW Wildlife Atlas record)	Crown: SOPA	Rare visitor. One recorded from Bicentennial Park in Oct 2004 (Atlas of NSW Wildlife record).
**Black-tailed Godwit	Vulnerable	1990s (SOPA 2007b)	Crown: SOPA	A rare visitor with no recent documented records (Morris <i>et al.</i> 1990; SOPA 2007b; Atlas of NSW Wildlife records).
**Great Knot	Vulnerable	1980s (Morris <i>et al.</i> 1990)	Crown: SOPA	As for Black-tailed Godwit.
**Broad-billed Sandpiper	Vulnerable	1978 (NSW Wildlife Atlas record)	Crown: SOPA	A rare visitor with no recent documented records (SOPA 2007b; Atlas of NSW Wildlife records).
Painted Snipe (UNCONFIRMED VAGRANT)	Endangered	2002 (NSW Wildlife Atlas record)	Crown: SOPA	Unconfirmed vagrant. The only listing is from a Birds Australia Atlas record from Bicentennial Park in Mar 2002. A very rare visitor to the Sydney region (Hoskin <i>et al.</i> 1991).
**Little Tern	Endangered	1985 (Morris <i>et al.</i> 1990)	Crown: SOPA	No recent documented records. Formerly an uncommon summer migrant that previously nested up until 1964/65 on a sandspit in Homebush Bay (Morris 1979; Morris <i>et al.</i> 1990).
Rose-crowned Fruit-Dove (VAGRANT)	Vulnerable	2006 (Birdline NSW records)	Crown: SOPA	The only documented record is of a single immature bird adjacent to the bird hide in Bicentennial Park in Oct 2006 (Birdline NSW records).
Gang-gang Cockatoo (VAGRANT)	Vulnerable	1997 (Birdline NSW)	Crown: SOPA	Vagrant to woodland in Newington NR with two birds recorded in July 1997 (Gladwin 1997a).
**Swift Parrot	Endangered	2002 (SOPA 2007b)	Crown: SOPA	Rare visitor last recorded in 1991 in the Bicentennial Park area (SOPA 2007b).
**Grass Owl (VAGRANT)	Vulnerable	1982 (NSW Wildlife Atlas record)	Crown: SOPA	Vagrant to the Sydney region (Hoskin <i>et al.</i> 1991; Hobcroft & James 1997). The only documented record is of a single individual recorded from the edge of a shallow freshwater pond amidst grassland adjacent to Bennelong Road in Oct 1982 (Hobcroft & James 1997).
**Black-chinned Honeyeater	Vulnerable	1940s (SOPA 2007b)	Crown: SOPA	Vagrant with no recent records (SOPA 2007b).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Crown: SOPA	Likely to be a regular visitor in varying numbers when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2002 (SOPA 2006)	Crown: SOPA	Recorded from the Brickpit, Newington NR and Bicentennial Park (SOPA 2006). This species was found roosting in stormwater drains in nearby suburbs.
Little Bentwing-bat	Vulnerable	2002 (SOPA 2006)	Crown: SOPA	Recorded by the identification of ultrasonic signals using Anabat from Bicentennial Park in autumn 2002 (SOPA 2006). This record represents one of the most southerly documented records for this species (see also Upper Hacking site).

* As listed under TSC Act 1995. ** Only recorded prior to 1997.

Additional Faunal Values: The site supports a minor multi-species migratory shorebird roost and feeding area in tidal wetlands, such as the waterbird refuge area within the Badu Mangroves; minor migratory shorebird feeding areas in freshwater wetlands, such as Narawang Wetlands and wetlands

in Newington NR, particularly for the Latham's Snipe; small colony of nesting waterbirds (notably the Darter and Little Pied Cormorant) on Lake Belvedere and Haslams Creek. *Note:* The Nankeen Night Heron, a regionally significant species, formerly nested in mangroves in Homebush Bay (e.g. 30 to 50 nests in 1996; Hoskin *et al.* 1991). Additionally, there are breeding records of a number of waterbird species that rarely nest within the CMA, such as the Pink-eared Duck and Red-kneed Dotterel (e.g. Hoskin *et al.* 1991).

Identified Threats to Fauna Values:

High: Habitat continuity within the site; water quality, including in tidal areas from the Parramatta River, stormwater runoff from adjacent residential areas and leachate from buried landfill material; associated algal blooms; limited habitat link with remnant vegetation in other reserves, such as upstream on the Parramatta River; impacts from adjoining developments along the Parramatta River, such as in Rhodes; mangrove encroachment on to intertidal flats and saltmarsh; impacts of mosquito control remediation, such as the application of larvacides in wetland areas; disturbance due to artificial lighting, noise and high visitation levels in some areas; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Weed infestation, particularly in saltmarsh areas from Spiny Rush *Juncus acutus*; impacts of fire; loss of hollow-bearing trees; predation by free-ranging domestic cats; predation by feral animals (such as the Black Rat, Fox and Feral Cat); entanglement in discarded fishing tackle; disturbance in some parts of the site due to high levels of public visitation; disturbance by uncontrolled domestic dogs; competition for hollows by feral Honeybees *Apis mellifera*; impact of electromagnetic field close to radio transmission towers, such as Nuwi Wetlands



The Brickpit provides habitat for the Green and Golden Bell Frog. M. Schulz/DECC



A number of artificial wetlands have been created to provide habitat for the Green and Golden Bell Frog. M. Schulz/DECC



A 5 year management program has halted the invasion of Spiny Rush into saltmarsh habitat. M. Schulz/DECC

Land Management:

The site comprises land managed by the Sydney Olympic Park Authority, including Newington NR which it manages on behalf of DECC under the terms of a Memorandum of Understanding.

References and Further Reading:

Australian Museum Business Services (2002a, b), Avifauna Research and Services (2002), Birds Australia (2000, 2002), Cogger (2002), DEC (2005b), Denny (2002), Fairley & Waterhouse (2005), Fly-By-Night Bat Surveys (2002), Gladwin (1997a), Hobcroft & James (1997), Hoskin *et al.* (1991), Hoye & Spence (2004), Morris (1979), Morris *et al.* (1990), Mt King Ecological Surveys (1992), NSW National Parks and Wildlife Service (2001c), Sydney Olympic Park Authority (2002a, b, 2006a, b, c, 2007a, b), SOPA & NPWS (2003).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – Fairley & Waterhouse (2005); +5 – Sydney Olympic Park Authority (2006a); +6 – Sydney Olympic Park Authority (2002), +7 – Sydney Olympic Park Authority (2006b); +8 – Sydney Olympic Park Authority (2006c); +9 – SOPA (2007b); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris *et al.* 1990); *3- only recorded prior to 1997 (Sydney Olympic Park Authority 2006c); *4 – only recorded prior to 1997 (Cogger 2002); *5 – only recorded prior to 1997 (SOPA 2007b).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+8	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*3	P	
Southern Scaly-foot <i>Pygopus lepidopodus</i>	*3	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+8	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+8	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+8	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+8	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+8	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+9	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	*4	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Musk Duck <i>Biziura lobata</i>	+3	P	RS
Freckled Duck <i>Stictonetta naevosa</i>	*1	V	
Black Swan <i>Cygnus atratus</i>	+2	P	
Australian Shelduck <i>Tadorna tadornoides</i>	+3	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Mallard <i>Anas platyrhynchos</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchos</i>	+3	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	+2	P	
Hardhead <i>Aythya australis</i>	+2	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+2	P	
Hoary-headed Grebe <i>Poliocephalus poliocephalus</i>	+4	P	
Great Crested Grebe <i>Podiceps cristatus</i>	+9	P	RS
Darter <i>Anhinga melanogaster</i>	+1	P	

Species	Status	Legal Status	Regional Status
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+2	P	
White-necked Heron <i>Ardea pacifica</i>	+9	P	
Great Egret <i>Ardea alba</i>	+2	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+2	P	
Cattle Egret <i>Ardea ibis</i>	+1	P	
Striated Heron <i>Butorides striatus</i>	+2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	+3	P	RS
Australasian Bittern <i>Botaurus poiciloptilus</i>	+9	V	
Glossy Ibis <i>Plegadis falcinellus</i>	+3	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+2	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+3	P	
Osprey <i>Pandion haliaetus</i>	+2	V	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Spotted Harrier <i>Circus assimilis</i>	+3	P	
Swamp Harrier <i>Circus approximans</i>	+3	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+5	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+5	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+9	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+5	P	RS
Brown Falcon <i>Falco berigora</i>	+2	P	
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+9	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+5	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	+1	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+4	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Black-tailed Native-hen <i>Gallinula ventralis</i>	+3	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Latham's Snipe <i>Gallinago hardwickii</i>	+1	P	RS
Black-tailed Godwit <i>Limosa limosa</i>	*1	V	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Whimbrel <i>Numenius phaeopus</i>	*1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+3	P	RS
Marsh Sandpiper <i>Tringa stagnatilis</i>	+3	P	RS
Common Greenshank <i>Tringa nebularia</i>	+4	P	RS
Wood Sandpiper <i>Tringa glareola</i>	+3	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+2	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+9	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+3	P	RS
Great Knot <i>Calidris tenuirostris</i>	*2	V	
Red Knot <i>Calidris canutus</i>	*2	P	RS
Red-necked Stint <i>Calidris ruficollis</i>	+2	P	RS
Pectoral Sandpiper <i>Calidris melanotos</i>	+3	P	
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+1	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	+2	P	RS
Broad-billed Sandpiper <i>Limicola falcinellus</i>	+2	V	
Australian Painted Snipe <i>Rostratula benghalensis australis</i>	+5	E1	Unconfirmed
Black-winged Stilt <i>Himantopus himantopus</i>	+1	P	
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	+1	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+4	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	+3	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	*1	P	RS
Black-fronted Dotterel <i>Elsayornis melanops</i>	+1	P	
Red-kneed Dotterel <i>Erythronyx cinctus</i>	+2	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Gull-billed Tern <i>Sterna nilotica</i>	+9	P	
Caspian Tern <i>Sterna caspia</i>	+2	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Common Tern <i>Sterna hirundo</i>	+2	P	RS
Little Tern <i>Sterna albifrons</i>	*2	E1	
Whiskered Tern <i>Chlidonias hybridus</i>	+2	P	RS
White-winged Black Tern <i>Chlidonias leucopterus</i>	*1	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	+9	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Rose-crowned Fruit-Dove <i>Ptilinopus regina</i>	+3	V	
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+9	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+5	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+3	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+5	P	

Species	Status	Legal Status	Regional Status
Little Corella <i>Cacatua pastinator</i>	+9	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+5	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+5	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+9	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+3	P	
Swift Parrot <i>Lathamus discolor</i>	*5	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+5	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+9	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+9	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+3	P	
Southern Boobook <i>Ninox boobook</i>	+3	P	
Barn Owl <i>Tyto alba</i>	+9	P	
Grass Owl <i>Tyto capensis</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+5	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Azure Kingfisher <i>Alcedo azurea</i>	*1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+3	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+5	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+5	P	
Mangrove Gerygone <i>Gerygone levigaster</i>	+3	P	RS
White-throated Gerygone <i>Gerygone olivacea</i>	+9	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+9	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+5	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+2	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	*5	V	

Species	Status	Legal Status	Regional Status
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+1	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+9	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+9	P	
White-fronted Chat <i>Epthianura albifrons</i>	+2	P	RS
Rose Robin <i>Petroica rosea</i>	+9	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+9	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+5	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+5	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+3	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+9	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+4	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+3	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Cicadabird <i>Coracina tenuirostris</i>	+9	P	
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+5	P	
Masked Woodswallow <i>Artamus personatus</i>	+2	P	
White-breasted Woodswallow <i>Artamus leucorhynchus</i>	+9	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+5	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+9	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+2	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Zebra Finch <i>Taeniopygia guttata</i>	+3	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+2	U	
European Goldfinch <i>Carduelis carduelis</i>	+1	U	

Species	Status	Legal Status	Regional Status
Mistletoebird <i>Dicaeum hirundinaceum</i>	+5	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+2	P	
Fairy Martin <i>Petrochelidon ariel</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	+3	P	RS
Brown Songlark <i>Cincloramphus cruralis</i>	+2	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+5	P	RS
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+9	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+9	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+6	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+6	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+6	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+7	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+6	V	
Little Bentwing-bat <i>Miniopterus australis</i>	+6	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+6	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+6	P	
Water-rat <i>Hydromys chrysogaster</i>	+4	P	RS
House Mouse <i>Mus musculus</i>	+2	U	
Black Rat <i>Rattus rattus</i>	+9	U	
Fox <i>Vulpes vulpes</i>	+9	U	
Feral Cat <i>Felis catus</i>	+9	U	
Brown Hare <i>Lepus capensis</i>	+9	U	

Site 10: INGLESIDE - WARRIEWOOD

Location:

Mullet Creek from Pittwater Road upstream to east of Ingleside Road, including Warriewood Wetlands and Irrawong Reserve; and extending north to the Foleys Hill area including the upper reaches of Fern and Narrabeen Creeks (refer to Map i).

Relative Area Size in CMA:

Small

Sub-catchment:

Northern Beaches

Local Government Area:

Pittwater

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	7	4
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	168	96
Total	175	100

Environmental Setting:



Extensive reedbeds within the Warriewood Wetlands. M. Schulz/DECC



Swamp Mahogany woodland, Warriewood Wetlands. M. Schulz/DECC



High quality woodland on Hawkesbury Sandstone in the northern section of the site. M. Schulz/DECC

This site comprises two distinct sections: a) the Warriewood Wetlands and b) the sandstone areas of upper Mullet Creek and extending north to Foleys Hill.

The Warriewood Wetlands comprises the largest remaining sand plain wetland in northern Sydney (Pittwater Nature Heritage Association 2004). The wetland supports the largest stand of Swamp Mahogany *Eucalyptus robusta* in the CMA (identified as Swamp Sclerophyll Forest) and also supports other Endangered Ecological Communities listed under the TSC Act 1995, including Freshwater Wetland and Swamp Oak *Casuarina glauca* Floodplain Forest. The wetland area was formerly more extensive but agricultural activities from the mid 1800s led to significant alterations in water quality and vegetation condition (Pittwater Council 1998). The wetland was further impacted by the creation of a number of drains and creek diversions and prior to 1970 the wetland water level was largely influenced by Narrabeen Lagoon (Pittwater Council 1998). The remaining wetland area was the subject of community action regarding the proposed Warriewood Square Shopping Centre which resulted in a compromise whereby the shopping centre was built and the adjoining wetland was rezoned for environmental protection (Pittwater Council 1998). The reserved wetland area is little visited apart from two raised boardwalks that traverse two different sections of the swamp (the Swamp Forest and Angus Gordon Walks). Along Mullet Creek downstream of the Warriewood Wetlands the vegetation has been highly modified and is confined to a thin band of remnant riparian Swamp Oak dominated forest that gradually gives way to open grassed areas and scattered trees just north of Pittwater Road.

The higher altitude section of the site comprises Hawkesbury Sandstone of the Hornsby Plateau and is characterised by narrow convex ridges and steep slopes with occasional boulders and benches (Pittwater Council 1996). The vegetation is typical of Hawkesbury Sandstone terrain with the ridges

and shallow gullies dominated by dry sclerophyll forest (Keith 2004). Below the waterfall in Irrawong Reserve is an area of Lilly Pilly closed forest.

This area is tenuously linked in the north to Ku-ring-gai Chase NP across private land and is bisected by the busy Mona Vale Road. No continuous band of vegetation links this site with the Narrabeen Lake site along the lower reaches of Mullet Creek. The site supports three priority fauna habitats: forested wetland, rainforest, freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a diverse assemblage of fauna characteristic of the Northern Beaches, including a number of threatened species such as the Red-crowned Toadlet, Swift Parrot and Southern Myotis and a range of regionally significant species, including cryptic waterbirds, such as the Little Bittern, Latham’s Snipe and various crane and rail species.



The status of the Giant Burrowing Frog in the site is uncertain. D. Hunter/NPWS



A large population of the Long-nosed Bandicoot is present in the site. DECC



The endangered Regent Honeyeater is a rare visitor. NPWS

Priority Fauna Species Review:

There have been 207 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 166 birds, 20 mammals, 15 reptiles and six frogs. Of these two are considered endangered and nine as vulnerable (these are discussed below). A further 46 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
**Giant Burrowing Frog	Vulnerable	1994 (Atlas record)	Pittwater Council	Several old records on the Hawkesbury Sandstone sections of the site (Atlas of NSW Wildlife records). Current status unknown.
Red -crowned Toadlet	Vulnerable	2007 (Current study)	Pittwater Council	Two individuals heard calling in the upper reaches of Fern Creek in Mar 2007 (Current study). Located previously in this part of the site (Smith & Smith 2000b).
Rosenberg’s Goanna	Vulnerable	1999 (Atlas record)	Pittwater Council	One individual found road killed on Mona Vale Road (Atlas of NSW Wildlife record). Status uncertain.
Black Bittern	Vulnerable	2007 (Current study)	Pittwater Council	Status uncertain. Recorded from Warriewood Wetlands (Pittwater Nature Heritage

Species	Threat Category*	Last Recorded	Tenure	Comments
				Association 2004; Atlas of NSW Wildlife records). Also likely to occur along the lower reaches of Mullet Creek adjacent to Progress Park.
Glossy Black-Cockatoo	Vulnerable	2007 (Current study)	Widespread	Three individuals observed feeding in Forest Oak <i>Allocasuarina torulosa</i> east of Laurel Road East in Mar 2007 (Current study). Also recorded in the site by the Pittwater Nature Heritage Association (2004).
Swift Parrot	Endangered	Smith & Smith (2000b)	Pittwater Council	Occurs sporadically in the Warriewood Wetland-Irrawong Reserve section of the site when the Swamp Mahogany is in flower (Smith & Smith 2000b).
Powerful Owl	Vulnerable	2007 (Current study)	Pittwater Council; private land	A single female responded to playback east of Laurel Road East and a male was heard calling in Irrawong Reserve in Mar 2007 (Current study). Also recorded in the falls area of Irrawong Reserve by Pittwater Nature Heritage Association (2004) and in the Ingleside Road area in Apr 2003 (Atlas of NSW Wildlife record). Likely to nest in the site.
Masked Owl	Vulnerable	Smith & Smith (2000b)	Pittwater Council	No individuals located during two playback surveys within the area in Mar 2007 (Current study). A pair has attempted to nest in the area in the past (Smith & Smith 2000b).
Regent Honeyeater	Endangered	1998 (Regent Honeyeater Recovery Program database, DECC)	Uncertain	Occasionally recorded in the Warriewood Wetland-Irrawong Reserve section of the site when the Swamp Mahogany is in flower (Smith & Smith 2000b).
**Koala	Vulnerable	1995 (Pittwater Council 1996)	Pittwater Council	No recent records. (Atlas of NSW Wildlife records).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Likely to be a regular visitor in varying numbers to the site when the Red Bloodwood <i>Corymbia gummifera</i> and Swamp Mahogany is in flower. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2003 (Atlas record)	Widespread	Recorded in the Ingleside Road area in Apr 2003 (Atlas of NSW Wildlife record). No known roosts in the site.
Southern Myotis	Vulnerable	2007 (Current study)	Pittwater Council	Status uncertain. Two males trapped over Mullet Creek in Irrawong Reserve in Mar 2007 (Current study).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Warriewood Wetlands are occasionally used by small numbers of the migratory Latham's Snipe.

Identified Threats to Fauna Values:

High: Habitat loss within the site; habitat loss of areas to the north linking the site to Ku-ring-gai Chase NP; water quality, particularly runoff from adjacent housing developments and Warriewood Square Shopping Centre; weed infestation; edge effect particularly from housing and industrial encroachment on to fringing bushland areas.

Moderate: Predation by feral predators (such as the Foxes and Feral Dogs); predation by domestic cats; disturbance by uncontrolled domestic dogs; habitat disturbance by Rabbits; impacts of fire; bushrock removal; road mortality.



Fire frequency is an important issue in the site. M. Schulz/DECC



A popular destination; the waterfall in Irrawong Reserve. M. Schulz/DECC



Poor habitat link to the coast along lower Mullet Creek. M. Schulz/DECC

Land Management:

Complex, including Pittwater Council which manages a number of reserves and various private land owners. Any work in relation to protecting the diverse fauna values of the site needs to include a cooperative approach to protecting remaining bushland linking the area to Ku-ring-gai Chase NP.

References and Further Reading:

Keith (2004), Pittwater Council (1996, 1998), Pittwater Nature Heritage Association (2004), Smith & Smith (2000b), Turton (1996).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Smith & Smith (2000b); +4 – Pittwater Nature Heritage Association (2004); +5 – Records from various observers posted on the Birding-aus website; * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Pittwater Council 1996, 1998).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	*	V	
Striped Marsh Frog <i>Limnodynastes peronii</i>	*1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Tyler's Tree Frog <i>Litoria tyleri</i>	+1	P	
Reptiles:			
Eastern Snake-necked Turtle <i>Chelodina longicollis</i>	*1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+2	V	
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	*1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	*1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	*1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	*1	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	*1	P	RS
Yellow-faced Whipsnake <i>Demansia psammophis</i>	+2	P	
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+5	P	
Birds:			
Australian Brush-turkey <i>Alectura lathamii</i>	+5	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+4	P	RS
King Quail <i>Coturnix chinensis</i>	+4	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+4	P	
Striated Heron <i>Butorides striatus</i>	+5	P	

Species	Status	Legal Status	Regional Status
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	+4	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+4	V	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	+4	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+5	P	RS
Spotted Harrier <i>Circus assimilis</i>	+5	P	
Swamp Harrier <i>Circus approximans</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+5	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+5	P	RS
Australian Hobby <i>Falco longipennis</i>	+5	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+4	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+4	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	+4	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+5	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	+4	P	RS
Black-fronted Dotterel <i>Elsayornis melanops</i>	+4	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	+4	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+4	P	RS
Emerald Dove <i>Chalcophaps indica</i>	+5	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	+4	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+4	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathamii</i>	+1	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+4	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	

Species	Status	Legal Status	Regional Status
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chlorolepidotus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+4	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+3	E1	
Brush Cuckoo <i>Cacomantis variolosus</i>	+4	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+4	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+4	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+2	P	RS
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Masked Owl <i>Tyto novaehollandiae</i>	+3	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+5	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Fork-tailed Swift <i>Apus pacificus</i>	+4	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+4	P	
Noisy Pitta <i>Pitta versicolor</i>	+4	P	RS
Superb Lyrebird <i>Menura novaehollandiae</i>	+4	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+4	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	+4	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+4	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+4	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	

Species	Status	Legal Status	Regional Status
Noisy Friarbird <i>Philemon corniculatus</i>	+4	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	+3	E1	
Blue-faced Honeyeater <i>Entomyzon cyanotis</i>	+5	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+4	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+4	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+5	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+4	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Rose Robin <i>Petroica rosea</i>	+4	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+4	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+4	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+4	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Cicadabird <i>Coracina tenuirostris</i>	+4	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+1	P	
White-breasted Woodswallow <i>Artamus leucorhynchus</i>	+4	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+4	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	+4	P	RS
European Goldfinch <i>Carduelis carduelis</i>	+4	U	

Species	Status	Legal Status	Regional Status
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+4	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Brown Songlark <i>Cinclorhamphus cruralis</i>	+4	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+4	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+4	U	
Bassian Thrush <i>Zoothera lunulata</i>	+4	P	RS
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Platypus <i>Ornithorhynchus anatinus</i>	+2	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Koala <i>Phascolarctos cinereus</i>	*1	V	
Sugar Glider <i>Petaurus breviceps</i>	*1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Swamp Rat <i>Rattus lutreolus</i>	+2	P	RS
Black Rat <i>Rattus rattus</i>	*1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	*1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 11: NARRABEEN LAKE

Location:

Narrabeen Lake and Narrabeen Lagoon including fringing shoreline, Jamieson Park, upper reaches of South Creek and the undeveloped coastal strip between the north end of Narrabeen Beach and Turimetta Head including North Narrabeen Head (refer to Map i).

Relative Area Size in CMA:

Medium

Sub-catchment:

Northern Beaches

Local Government Area:

Warringah and Pittwater

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	310	87
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	46	13
Total	356	100

Environmental Setting:



Turimetta (foreground) and North Narrabeen Heads. M. Schulz/DECC



Narrabeen Lake. M. Schulz/DECC



Scrub She-oak dominated heathland, Turimetta Head. M. Schulz/DECC

This site comprises two distinct areas: a) Narrabeen Lake and coastal shoreline comprising Turimetta Beach and b) two distinctive headlands and associated reef platforms. The former area is a tidal lake covering 2.2 km², with important areas of seagrass meadows (NSW Department of Natural Resources 2007). It is the largest remaining coastal lagoon in the CMA that was once part of an ancient north-south river system formed during the Tertiary era (Taylor 1958). The shallow lake is flanked by sandstone hills which provide the catchment for three main creeks; Middle, Deep and South Creeks. There are two small vegetated islands in the vicinity of Pittwater Road and the lake is linked to the sea by a narrow channel termed ‘Shark Alley’. A variety of vegetation types associated with Narrabeen Group geology fringe the lake, primarily in the Jamieson Park area and south of Wakehurst Parkway. Parts of the area are heavily weed infested, with bush regeneration works currently underway. Some of the vegetation communities within these areas are poorly represented within the CMA including Bangalay *Eucalyptus botryoides* Slopes Forest and a number of endangered ecological communities including Swamp Sclerophyll Forest on Coastal Floodplains, Swamp Oak Floodplain Forest and Coastal Saltmarsh (Warringah Council 2005a). Much of the remainder of the fringing vegetation has been heavily modified.

North Narrabeen and Turimetta Heads are of Triassic age comprised of weathered rocks of the Bald Hill Claystone and Newport Formations, the uppermost subgroups of the Narrabeen Group (Pittwater Council 2002a, b). These headlands are vegetated by a variety of heathlands, including Sandstone Headland Heath dominated by Scrub She-oak *Allocasuarina distyla*, Coastal Banksia *Banksia integrifolia*–Coast Teatree *Leptospermum laevigatum* scrub and small patches of Kangaroo Grass *Themeda australis* grassland that is listed as an Endangered Ecological Community under the TSC Act 1995 (*Themeda australis* grassland on sea cliffs and coastal headlands in the Sydney Basin). The vegetation on North Narrabeen Head is partly modified as the area was used as a defence point and firing range in World War Two (Pittwater Council 2002b).

The site is immediately contiguous with the eastern edge of the Garigal – Oxford Falls site. It supports four priority fauna habitats: forested wetland, heathland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a wide variety of wetland and coastal plain fauna characteristic of the Northern Beaches including a number of species that are rare within the CMA. For example, it supports the only nesting location of the Osprey in the CMA and one of the only known locations for the Little Bentwing-bat within the region.



Black Bittern habitat, South Creek, Narrabeen Lake. M. Schulz/DECC



Narrabeen Lagoon supports the southernmost nesting location of the Osprey in NSW. M. Schulz



Long-nosed Bandicoot diggings, Jamieson Park. M. Schulz/DECC

Priority Fauna Species Review:

There have been 186 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 148 birds, 21 mammals, 13 reptiles and four frogs. Of these two are considered endangered and 11 as vulnerable (excluding unconfirmed species; discussed below). A further 38 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Rosenberg's Goanna	Vulnerable	2001 (B. Law, DPI (Forests) pers. comm.)	Warringah Council	One individual located in Smooth-barked Apple - Forest Oak <i>Allocasuarina torulosa</i> woodland adjacent to Narrabeen Lake shore in 2001 (B. Law, DPI (Forests) pers. comm.). Status within the site uncertain.
Black Bittern	Vulnerable	2007 (Current study; Smith & Smith 2007)	Crown; Warringah and Pittwater Councils	Status uncertain. One recorded on the eastern edge of Spring Creek in Mar 2007 (Current study) and one immature located between Deep and Middle Creeks in June 2007 (Smith & Smith 2007). Regularly observed along adjacent sections of Deep Creek (B. Law, DPI (Forests) pers. comm.). Previously recorded on the north side of Narrabeen Lake in Nov 2006 and Dec 2003,

Species	Threat Category*	Last Recorded	Tenure	Comments
				the mouth of Deep Creek in July 1997 and east of Pipeclay Point in Nov 1983 (Atlas of Wildlife records; Smith & Smith 2007).
**Australasian Bittern	Vulnerable	1984 (Atlas record)	Uncertain	One observed at Narrabeen Lake in Feb 1984 (Atlas of NSW Wildlife record). Likely to be a vagrant to the site.
Osprey	Vulnerable	2007 (Birdline NSW records)	Widespread foraging habitat; nest on private property	Regularly occurs along the shoreline and in Narrabeen Lake/Lagoon within the site (Pittwater Council 2002a, b; Smith & Smith 2004; Atlas of NSW Wildlife records). A pair in recent years has nested in a Norfolk Island Pine <i>Araucaria heterophylla</i> in a residential area adjacent to Narrabeen Lagoon, inland of Ocean Street.
Pied Oystercatcher	Vulnerable	2001 (Cox 2001)	Crown; Warringah and Pittwater Councils	Rare visitor to the site, with the last record being of a single bird at the mouth of South Creek (Cox 2001).
Sooty Oystercatcher	Vulnerable	2002 (Pittwater Council 2002a, b)	Crown; Warringah and Pittwater Councils	Occasionally occurs along exposed reef platforms within the site (Pittwater Council 2002a, b; B. Law, DPI (Forests) pers. comm.).
Glossy Black-Cockatoo	Vulnerable	2007 (Current study)	Crown; Warringah and Pittwater Councils	Three individuals observed feeding in Forest Oak west of Pipeclay Point in Apr 2007 (Current study). These birds fly into the area across the lake from nearby Garigal NP to the northwest (D. Harris, Australian Bushland Restoration Pty Ltd, pers comm.). Also recorded in this area on other occasions (e.g. Smith & Smith 2004; B. Law, DPI (Forests) pers. comm.).
Swift Parrot	Endangered	2007 (B. Cox pers. comm.)	NSW Academy of Sport; Warringah Council	Occasional sightings, particularly when the Swamp Mahogany is in flower, for example two individuals were observed in Apr 2007, two in May 2007 and three individuals in June 2007 (Birdline NSW records; Swift Parrot Recovery Program database, DECC).
Powerful Owl	Vulnerable	2006 (B. Law, DPI (Forests) pers. comm.)	Warringah Council and adjacent private land	Observed in gullies at Jamieson Park adjacent to the RSL Veterans Retirement Village (Australian Museum Business Services 1996; Smith & Smith 1998, 2004; B. Law, DPI (Forests) pers. comm.)
Regent Honeyeater	Endangered	1998 (Geering 1998)	NSW Academy of Sport; Warringah Council	Occasional visitor to the site when stands of Swamp Mahogany are in flower. No nesting records in the site.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Observed foraging on Coast Banksia <i>Banksia integrifolia</i>

Species	Threat Category*	Last Recorded	Tenure	Comments
				flowers within the site, particularly on North Narrabeen and Turimetta Heads in Apr 2007 (Current study). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	1997 (Australian Museum Business Services 1997)	Widespread	Detected using Anabat in the RSL Veterans Retirement Village area (Australian Museum Business Services 1996). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	2007 (B. Law, DPI (Forests) pers. comm.)	Widespread	As for the Little Bentwing-bat.
Little Bent-wing Bat	Vulnerable	2007 (B. Law, DPI (Forests) pers. comm.)	Widespread	Ultrasonic signals of this species have been identified adjacent to the lake (B. Law, DPI (Forests) pers. comm.). Likely to occur across the site. No known roosts in the area.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1997 (Atlas record)	Private	Unconfirmed record identified from ultrasonic calls recorded from the proposed extension to the RSL Veterans Retirement Village. The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Habitat loss; disturbance due to high public visitation; disturbance by uncontrolled domestic dogs; water quality; fauna habitat discontinuity; weed infestation; destruction of fringing reed beds; dredging.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); predation by domestic cats; habitat disturbance by Rabbits; impacts of fire; entanglement in discarded fishing tackle.



Highly developed entrance to Narrabeen Lagoon. M. Schulz/DECC



Boats and dogs are a major cause of disturbance to waterbirds in the site. M. Schulz/DECC



Fire has an unknown impact on the faunal values of the site. M. Schulz/DECC

Land Management:

The tenure of this site is complex, with much of the land managed by the Department of Lands, Pittwater and Warringah Councils. The intertidal zone at North Narrabeen Head is managed by DPI Fisheries as part of the Narrabeen Head Aquatic Reserve (NSW DPI Fisheries 2007d). Any work in relation to fauna protection within this area will require a cooperative approach to managing the site. Additionally, the site lies immediately adjacent to the Garigal–Oxford Falls site and both areas should be managed as a single unit to maintain biodiversity values.

References and Further Reading:

Australian Museum Business Services (1996), Basham (2005), Cox (2001, 2006), DECC (2007a, b), Geering (1998), Keith (2004), National Trust (1980), NSW Department of Natural Resources (2007), NSW DPI Fisheries (2007d), Pennay *et al.* (2004), Pittwater Council (2002a, b), Smith & Smith (1997, 1998, 2003, 2004, 2007), Taylor (1958), Turton (1996), Warringah Council (2005a, b, c).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Pittwater Council (2002a, b); +4 – Records from various observers posted on the Birding-aus website & Birdline NSW; +5 – B. Law, DPI (Forests), pers. comm.; +6 – B. Cox, pers. comm.; +7 – Smith & Smith (2007); +8 – Smith & Smith (2004); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (B. Cox, pers. comm.); *2 – only recorded prior to 1997 (Smith & Smith 1997, 2004).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Tusked Frog <i>Adelotus brevis</i>	*	P	
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Peron's Tree Frog <i>Litoria peronii</i>	*2	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+1	P	
Reptiles:			
Eastern Snake-necked Turtle <i>Chelodina longicollis</i>	*2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+5	V	
Lace Monitor <i>Varanus varius</i>	*2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	

Species	Status	Legal Status	Regional Status
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	*2	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	*2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+4	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+3	P	RS
Marsh Snake <i>Hemiaspis signata</i>	*2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+4	P	
Birds:			
Australian Brush-turkey <i>Alectura lathami</i>	+6	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+6	P	RS
Musk Duck <i>Biziura lobata</i>	+6	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchotis</i>	+6	P	RS
Grey Teal <i>Anas gracilis</i>	+6	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	*1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+4	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	*	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
White-necked Heron <i>Ardea pacifica</i>	*1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Cattle Egret <i>Ardea ibis</i>	+1	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Little Bittern <i>Ixobrychus minutus</i>	*	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+1	V	
Australasian Bittern <i>Botaurus poiciloptilus</i>	*	V	
Royal Spoonbill <i>Platalea regia</i>	+4	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+6	P	

Species	Status	Legal Status	Regional Status
Australian White Ibis <i>Threskiornis molucca</i>	+6	P	
Osprey <i>Pandion haliaetus</i>	+1	V	
Black-shouldered Kite <i>Elanus axillaris</i>	+3	P	
Whistling Kite <i>Haliastur sphenurus</i>	+3	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+4	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	*1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+6	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+6	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+4	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+6	P	
Eurasian Coot <i>Fulica atra</i>	*1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	+6	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Common Greenshank <i>Tringa nebularia</i>	+1	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+6	P	RS
Red-necked Stint <i>Calidris ruficollis</i>	+6	P	RS
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+1	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	+4	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+3	V	
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	*	P	
Black-winged Stilt <i>Himantopus himantopus</i>	*1	P	
Black-fronted Dotterel <i>Euseyornis melanops</i>	+6	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	*1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	*1	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	*1	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+6	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	*2	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+6	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	*1	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+1	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+4	P	

Species	Status	Legal Status	Regional Status
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+4	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+6	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+6	E1	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+6	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+6	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+6	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+4	P	RS
Powerful Owl <i>Ninox strenua</i>	+5	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+6	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+6	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	*1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+6	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+6	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+6	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+6	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	+1	E1	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+4	P	

Species	Status	Legal Status	Regional Status
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+3	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	*1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+6	P	
Fuscou Honeyeater <i>Lichenostomus fuscus</i>	+4	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+6	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+3	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+3	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+3	P	
Rose Robin <i>Petroica rosea</i>	+4	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+4	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
White-breasted Woodswallow <i>Artamus leucorhynchus</i>	+4	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	+4	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+3	P	RS
House Sparrow <i>Passer domesticus</i>	+2	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
European Goldfinch <i>Carduelis carduelis</i>	+6	U	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+6	P	
Fairy Martin <i>Petrochelidon ariel</i>	*2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+4	P	RS

Species	Status	Legal Status	Regional Status
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+6	P	RS
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+5	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+8	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+5	P	
Gould's Wattled Bat <i>Chalinobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinobus morio</i>	+2	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+7	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+5	V	
Little Bent-wing Bat <i>Miniopterus australis</i>	+5	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
House Mouse <i>Mus musculus</i>	+1	U	
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 12: UPPER GEORGES RIVER

Location:

Georges River from Dharawal SCArea downstream to the Georges River Council Nature Reserve (section just upstream of the confluence of Peter Meadows Creek), and extending eastwards to include bushland remnants on the Wedderburn plateau (refer to Map i). North of the Wedderburn area this site only encompasses the western side of the Georges River, with the Holsworthy Military Reserve (Site 5) immediately contiguous and extending from the Georges River eastwards.

Tenure:

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Campbelltown

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	223	14
Commonwealth Land	1	0
Remaining Public Land	0	0
Other	1324	86
Total	1547	100

Environmental Setting:



Georges River at The Woolwash, west of Campbelltown. M. Schulz/DECC



Gully forest along the Georges River at the Wedderburn Road crossing. M. Schulz/DECC



Dry woodland on Hawkesbury Sandstone upslope of the Georges River. M. Schulz/DECC

The site is situated along the Georges River in the far south west of the CMA. Much of the site forms a variable width band of continuous vegetation between Holsworthy Military Reserve to the east and the suburbs of St Helens Park, Airs and Kentlyn to the west. Part of the site includes remnant bushland extending on to the Wedderburn Plateau, particularly along a number of small watercourses. The landscape is dominated by vegetation communities associated with narrow incised valleys of Hawkesbury Sandstone along the Georges River and larger creek systems, with low cliff faces, extensive rocky areas and some overhangs. The incised watercourses are backed by a landscape of gently undulating crests, ridges and plateau surfaces of the Mittagong formation with a variety of drier woodland communities, including areas of Sandstone/Shale Transition Forest (an endangered ecological community). In the Appin Road area Wianamatta Group shales occur supporting Cumberland Plain Woodland communities (an endangered ecological community) dominated by Spotted Gum *Corymbia maculata*, Thin-leaved Stringybark *Eucalyptus eugenioides* and Broad-leaved Ironbark *E. fibrosa*. The continuous vegetation is generally little disturbed, except on the upslope edge where it backs on to residential areas and as a result of frequent fires. The water quality of the river is poor after rain due to stormwater and septic runoff as evidenced by signs erected at popular swimming locations, such as The Woolwash. This site is located on the western edge of a much larger protected area system that extends from Royal NP in the north and Budderoo and Morton NP in the south (NSW National Parks and Wildlife Service 2000a). It also provides a link between extensive bushland areas to the east such as Holsworthy Military Area, Dharawal SCArea, Woronora Special Area and Heathcote NP and the Nepean River corridor to the west in the Appin Road area. However, current habitat links west of the site within the Hawkesbury–Nepean CMA occur on private land and traverse the high traffic volume Appin Road. The site supports one priority fauna habitat: grassy woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a mixed assemblage of fauna associated with Hawkesbury Sandstone vegetation communities and Shale Sandstone Transition Forest, including a number of threatened species that are very rare and almost locally extinct within the CMA, such as the Brown Treecreeper and Squirrel Glider.



This is the only site in the CMA with recent records of the threatened Brown Treecreeper. M. Schulz



Koalas are widespread within the site, particularly along the Georges River. A. Dudley



The distinctive threatened Gang-gang Cockatoo is an infrequent winter visitor. K. Madden

Priority Fauna Species Review:

There have been 202 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 129 birds, 33 mammals, 26 reptiles and 14 frogs. Of these one is considered endangered and 13 as vulnerable (excluding unconfirmed species; these are discussed below). A further 42 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2002 (Atlas record)	Private	Status uncertain with only one documented recent record in May 2002 (Atlas of NSW Wildlife record).
Broad-headed Snake	Endangered	2000 (Atlas record)	Private	Status uncertain with only one documented recent record in Jun 2000 (Atlas of NSW Wildlife record).
Glossy Black-Cockatoo	Vulnerable	2000 (Atlas record)	Private	Occasional visitor with two documented recent records (Atlas of NSW Wildlife records).
Gang-gang Cockatoo	Vulnerable	2002 (Atlas record)	Private	Occasional predominantly winter visitor with five documented recent records (Atlas of NSW Wildlife records; Leishman 1994).
**Swift Parrot	Endangered	1983 (Leishman 1994)	Private	Occasional visitor to flowering Spotted Gums in the Appin Road area, such as 20+ individuals in May 1983 (Leishman 1994).
Powerful Owl	Vulnerable	2005 (Atlas record)	Private	Status uncertain with only one documented recent record in Dec 2005 (Atlas of NSW Wildlife record).
**Masked Owl	Vulnerable	1974 (Leishman 1994)	Private	Rare visitor. One observed roosting in a Spotted Gum in the Appin Road area in 1974 (Leishman 1994).
Brown Treecreeper	Vulnerable	1999 (Atlas record)	Private and Crown land	Status uncertain with only one documented recent record upslope of

Species	Threat Category*	Last Recorded	Tenure	Comments
				the eastern side of the Georges River in Mar 1999 (Atlas of NSW Wildlife record). Interestingly none were recorded over a 20 year period between 1973 and 1993 in the Appin Road area (Leishman 1994).
**Black-chinned Honeyeater	Vulnerable	1993 (Leishman 1994)	Private	Uncommon visitor in the Appin Road area (e.g. Leishman 1994). Likely to occur elsewhere within the site.
**Diamond Firetail	Vulnerable	1990 (Leishman 1994)	Private	Occasional visitor in the Appin Road area (e.g. Leishman 1994).
Spotted-tailed Quoll	Vulnerable	1998 (Atlas record)	Private (adjacent to boundary)	Status uncertain with only one documented recent record from the junction of Katanna and Winton Roads, Wedderburn upslope of the eastern side of the Georges River in May 1998 (Atlas of NSW Wildlife record).
Koala	Vulnerable	1998 (Atlas record)	Widespread	Scattered records across the site, with the majority of records adjacent to the Georges River. The Georges River supports high quality habitat which forms part of a corridor between the Campbelltown and Avon/Nepean colonies, termed the Cumberland Koala Linkage (DECC 2007a).
Eastern Pygmy-possum	Vulnerable	2004 (Atlas record)	Private	Status uncertain with only one documented recent record in the Wedderburn area in Sept 2004 (Atlas of NSW Wildlife record).
Squirrel Glider	Vulnerable	2000 (Atlas record)	Private	Status uncertain. Three recent records from the Wedderburn area (Atlas of NSW Wildlife records).
Grey-headed Flying-fox	Vulnerable	2000 (Atlas record)	Widespread	Likely to be a regular visitor in varying numbers when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Large-eared Pied Bat	Vulnerable	2004 (Atlas record)	Private	Status uncertain. A single individual trapped east of Hillcrest Road on the Wedderburn Plateau in Apr 2004 (Atlas of NSW Wildlife record).
Southern Myotis	Vulnerable	2004 (Atlas record)	Private and Crown land	Scattered records, such as at The Woolwash on the Georges River (Atlas of NSW Wildlife records). No roosts have been located within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Private	A single record identified by ultrasonic signals using Anabat at The Woolwash on the Georges River in Oct 1999 (Atlas of NSW Wildlife record). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).
Greater Broad-nosed Bat	Vulnerable	2004 (Atlas record)	Private and Crown land	Scattered records (Atlas of NSW Wildlife records).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil for vertebrate species. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Atlas of NSW Wildlife record).

Identified Threats to Fauna Values:

High: Habitat loss, such as associated with new developments; habitat discontinuity within parts of the site; habitat loss in the adjoining Holsworthy Military Reserve; loss of habitat links with the Nepean River; impacts of fire (i.e. high fire frequency); water quality, including from stormwater runoff, septic overflows and rubbish dumping; housing encroachment on to remnant habitat.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); habitat disturbance by Rabbits; disturbance by uncontrolled domestic dogs; predation by wide-ranging domestic cats; competition for hollows by feral Honeybees *Apis mellifera*; weed infestation; bushrock removal; rubbish dumping; tree dieback; increased sedimentation in the Georges River.



Signs have been erected to reduce Koala mortality on roads within the site, such as along Appin Road. M. Schulz/DECC



Beneath the tranquil surface of the Georges R



Tree hollows are plentiful in woodland and forest across much of the site. M. Schulz/DECC

Land Management:

The tenure of this site is complex. Along the Georges River the site primarily comprises Crown land and a number of reserves managed by Campbelltown City Council forming sections of the Georges River Council Nature Reserve. In the Wedderburn and Appin Road areas much of the area is privately owned. Habitat links westward from the site to the Nepean River habitat corridor are largely located in the Hawkesbury–Nepean CMA. Protection of these habitat links need to be jointly investigated by the two CMAs and other relevant authorities.

References and Further Reading:

Campbelltown City Council (2003, 2004), DECC (2007a, b), Keith (2004), Leishman (1994), NSW National Parks and Wildlife Service (2000a, 2001d), Pennay *et al.* (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Leishman 1994).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+2	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Freycinet's Frog <i>Litoria freycineti</i>	+2	P	RS
Broad-palmed Frog <i>Litoria latopalmata</i>	+2	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+2	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+2	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+2	P	
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+2	P	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+2	P	
Tree-base Litter-skink <i>Carlia foliorum</i>	+2	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
White's Rock-skink <i>Egernia whitii</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Eastern Brown Tree Snake <i>Boiga irregularis</i>	+2	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+2	E1	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+2	P	RS
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+2	P	
White-necked Heron <i>Ardea pacifica</i>	+2	P	
Cattle Egret <i>Ardea ibis</i>	+2	P	

Species	Status	Legal Status	Regional Status
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+2	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+2	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Spotted Harrier <i>Circus assimilis</i>	*2	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+2	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	*2	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+2	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+2	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+2	P	RS
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Common Bronzewing <i>Phaps chalcoptera</i>	+2	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	*2	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+2	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+2	V	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+2	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Swift Parrot <i>Lathamus discolor</i>	*2	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+2	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+2	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	*2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	

Species	Status	Legal Status	Regional Status
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Masked Owl <i>Tyto novaehollandiae</i>	*2	V	
Barn Owl <i>Tyto alba</i>	*2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+2	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+2	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Rainbow Bee-eater <i>Merops ornatus</i>	*2	P	RS
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+2	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Brown Treecreeper <i>Climacteris picumnus</i>	+2	V	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+2	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
Rockwarbler <i>Origma solitaria</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	*2	P	RS
Weebill <i>Smicronis brevirostris</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+2	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	*2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+2	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	*2	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	*2	V	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+2	P	

Species	Status	Legal Status	Regional Status
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Jacky Winter <i>Microeca fascinans</i>	*2	P	RS
Scarlet Robin <i>Petroica boodang</i>	+2	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Spotted Quail-thrush <i>Cinlosoma punctatum</i>	+2	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+2	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+2	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*2	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+2	P	
White-winged Triller <i>Lalage tricolor</i>	*2	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
White-breasted Woodswallow <i>Artamus leucorhynchus</i>	+2	P	
Masked Woodswallow <i>Artamus personatus</i>	*2	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+2	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+2	P	
Grey Currawong <i>Strepera versicolor</i>	*2	P	
Australian Raven <i>Corvus coronoides</i>	+2	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	*2	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+2	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	

Species	Status	Legal Status	Regional Status
Diamond Firetail <i>Stagonopleura guttata</i>	*2	V	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Silvereeye <i>Zosterops lateralis</i>	+2	P	
Bassian Thrush <i>Zoothera lunulata</i>	+2	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	+2	V	
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+2	V	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Squirrel Glider <i>Petaurus norfolcensis</i>	+2	V	
Greater Glider <i>Petauroides volans</i>	+2	P	RS
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+2	P	RS
Red-necked Wallaby <i>Macropus rufogriseus</i>	+2	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	+2	V	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+2	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 13: PROSPECT RESERVOIR

Location:

Prospect Reservoir and surrounding bushland areas within the Prospect Special Area and Prospect NR (refer to Map i).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Blacktown, Fairfield and Holroyd

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	343	30
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	776	69
Other	10	1
Total	1129	100

Environmental Setting:



Water stored in Prospect Reservoir supplies Sydney M. Schulz/DECC



Woodland with an open grassy understorey is typical of the vegetation in the site. M. Schulz/DECC



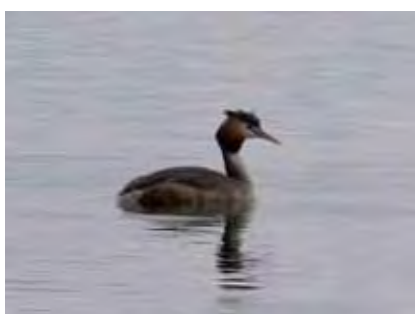
Tall Spotted Gum woodland on the western boundary. M. Schulz/DECC

This site is situated on the Cumberland Plain in the transition between rural and urban landscapes within the upper Georges River catchment on the western edge of the CMA. The area is dominated by Prospect Reservoir which has had a long history of catchment protection and restricted access since its establishment in 1869. Prospect Reservoir is used as reserve water storage and forms an integral part of SC Authority’s operating system for the provision of Sydney’s bulk raw water. The surrounding bushland area is dominated by Wianamatta Group shales in gently undulating terrain. Freshwater wetlands bordering the open waters of the reservoir provide some of the largest and most intact examples of this vegetation type within the CMA (NSW National Parks and Wildlife Service 2007a). The surrounding remnant vegetation of Cumberland Plain woodland comprises two endangered ecological ecosystems under the TSC Act (1995): Shale Plains Woodland and Shale Hills Woodland (NSW National Parks and Wildlife Service 2007a). Unlike adjacent habitat remnants (e.g. Western Sydney Regional Park) weeds tend to occur as scattered individuals or localised concentrations, with the most problematic species being the African Olive *Olea europaea* subspecies *cuspidata* and Moth Plant *Araujia hortorum*. Since this site comprises the Prospect Special Area public entry is not permitted in order to protect the water supply and to control pollution and disease. This site is marginally linked by discontinuous vegetation to Western Sydney RP, with a number of habitat discontinuities due to current land use practices and roads and other easements. Additionally, within the Blacktown LGA a potential corridor has been identified along Eastern Creek (NSW National Parks and Wildlife Service 2007a). The site primarily comprises two priority fauna habitats: grassy woodland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	High

Fauna Overview: A diverse fauna is present that is both characteristic of grassy woodlands, including threatened species that are uncommon within the CMA such as the Swift Parrot and potentially the Squirrel Glider and fauna associated with the waters of the reservoir including the endangered Green and Golden Bell Frog, vulnerable Southern Myotis and congregations of some species of waterbirds that are little seen elsewhere within the CMA, such as the regionally significant Great Crested Grebe and Musk Duck.



Prospect Reservoir supports the largest numbers of the regionally significant Great Crested Grebe within the CMA. M. Schulz



The little disturbed deep waters of Prospect Reservoir provides ideal habitat for the regionally rare Musk Duck. M. Schulz



The uncommon Grey Goshawk is resident within the site. M. Schulz

Priority Fauna Species Review:

There have been 206 vertebrate fauna species (excluding fish, unconfirmed species and escapees) documented within this area in the last 10 years: 163 birds, 22 mammals, 12 reptiles and nine frogs. Of these two species are considered endangered and three species as vulnerable (excluding unconfirmed species; discussed below). A further 46 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: DECC, SCA	Current status uncertain. Several records from Bull-rush <i>Typha</i> bordering the dam in Apr 2003 (Atlas of NSW Wildlife records). Not listed as a current locality in the draft recovery plan for the species (DEC 2005b).
**Bush Stone-curlew	Endangered	1972 (Vella 2004b)	Crown: DECC, SCA	One historical record in 1972 (Vella 2004b).
Swift Parrot	Endangered	2007 (Vella 2007)	Crown: DECC, SCA	Regular visitor in small numbers between autumn and early spring when eucalypt species are in blossom, such as Grey Box <i>Eucalyptus moluccana</i> and Forest Red Gum <i>E. tereticornis</i> . For example, one individual seen in Aug 2007 (Vella 2007), two in Aug 2005 (Vella 2005), one in May 2004 (Vella 2004a) and 10 in early Sept 2000 (Vella 2000).
**Speckled Warbler	Vulnerable	Undated (Vella 2004b)	Crown: DECC, SCA	Formerly present in the area (A. Coleman, cited in Vella 2004b).
**Squirrel Glider	Vulnerable	1989 (Atlas)	Crown:	Status uncertain since no recent

Species	Threat Category*	Last Recorded	Tenure	Comments
		record)	DECC, SCA	spotlighting surveys have been undertaken. The only record is from the Water Supply Reserve on the south side of the site. If still present it is likely to occur in woodland in the Prospect NR.
Grey-headed Flying-fox	Vulnerable	2004 (Atlas record)	Crown: DECC, SCA	Forages in the site when suitable trees and shrubs are in flower or fruit (Atlas of NSW Wildlife records). No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2002 (Atlas record)	Widespread foraging habitat; roost: Crown: SCA	Recorded roosting in Prospect Reservoir tunnel (Atlas of NSW Wildlife records). Likely to forage in a wide range of habitats across the site.
Southern Myotis	Vulnerable	1999 (Atlas record)	Crown: DECC, SCA	One record on the northern edge of the Reservoir in Oct 1999 (Atlas of NSW Wildlife record). Likely to occur widely around the Reservoir and may potentially roost in Prospect Reservoir tunnel.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Crown: DECC, SCA	One unconfirmed record identified from ultrasonic calls recorded from on the northern side of the Reservoir in Oct 1999 (Atlas of NSW Wildlife record). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Cave-dwelling bat roost located in Prospect Reservoir tunnel; shoreline occasionally used by small numbers of migratory shorebirds (i.e. Latham's Snipe); the Great Crested Grebe regularly nests on the waters of the reservoir, the only regular breeding site for this species within the CMA. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Atlas of NSW Wildlife records).

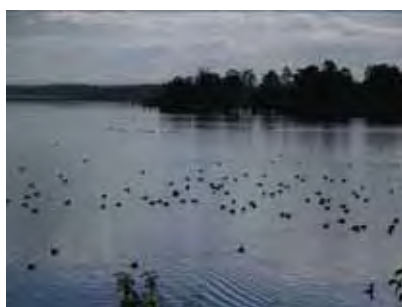
Identified Threats to Fauna Values:

High: Habitat loss (outside the Prospect NR); weed infestation (particularly from the African Olive); tree dieback; loss of remaining hollow-bearing trees; impacts associated with development of adjoining lands; impacts associated with alteration to the current management practices of the SC Authority; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); impacts of Rabbit grazing; impacts of fire; competition for hollows by feral Honeybees *Apis mellifera*; erosion; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.



The high faunal values in the site are in part due to restricted public access. M. Schulz/DECC



Prospect Reservoir supports some of the largest waterbird numbers in the CMA. M. Schulz/DECC



The site is bordered by extensive industrial areas on the eastern side. M. Schulz/DECC

Land Management:

This site which comprises the Prospect Special Area includes Prospect NR managed by DECC and the Water Supply Reserve managed by SCA. A small section of private land is included on the eastern edge of the site.

References and Further Reading:

DEC (2005c), DECC (2007b), Keith (2004), Kevin Mills & Associates (1991), Molino Stewart (2001), NSW National Parks and Wildlife Service (1997, 2001c, d, 2007a), Pennay *et al.* (2004), Thomas (1993), Vella (2000, 2004a, b, 2005, 2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – additional records from Current study; +5 – Vella (2004b); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 - only recorded prior to 1997 (Records from various observers posted on the Birding-aus website); *2 – only recorded prior to 1997 (NSW National Parks and Wildlife Service 2007a); *3 - only recorded prior to 1997 (Vella 2004b); *4 - only recorded prior to 1997 (Thomas 1993).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	*	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+3	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+3	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	*	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+4	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	*	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+3	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Birds:			
Stubble Quail <i>Coturnix pectoralis</i>	+4	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Musk Duck <i>Biziura lobata</i>	+3	P	RS
Black Swan <i>Cygnus atratus</i>	+2	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Australasian Shoveler <i>Anas rhynchos</i>	+3	P	RS
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+4	P	
Hardhead <i>Aythya australis</i>	+2	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+2	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+3	P	
Great Crested Grebe <i>Podiceps cristatus</i>	+2	P	RS
Darter <i>Anhinga melanogaster</i>	+3	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+2	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+3	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+2	P	
Little Egret <i>Egretta garzetta</i>	+3	P	
White-necked Heron <i>Ardea pacifica</i>	+3	P	
Great Egret <i>Ardea alba</i>	+3	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+3	P	
Cattle Egret <i>Ardea ibis</i>	+5	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+3	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+3	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+3	P	
Royal Spoonbill <i>Platalea regia</i>	+3	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	*3	P	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+2	P	
Whistling Kite <i>Haliastur sphenurus</i>	+3	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+3	P	RS
Spotted Harrier <i>Circus assimilis</i>	+3	P	

Species	Status	Legal Status	Regional Status
Swamp Harrier <i>Circus approximans</i>	+3	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+3	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+3	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+3	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+3	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+3	P	RS
Brown Falcon <i>Falco berigora</i>	+3	P	
Black Falcon <i>Falco subniger</i>	+5	P	
Australian Hobby <i>Falco longipennis</i>	+3	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+2	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+3	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+3	P	RS
Baillon's Crake <i>Porzana pusilla</i>	*3	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	+4	P	RS
Spotless Crake <i>Porzana tabuensis</i>	*3	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+3	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+2	P	
Eurasian Coot <i>Fulica atra</i>	+2	P	
Painted Button-quail <i>Turnix varia</i>	+3	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	+3	P	RS
Bush Stone-curlew <i>Burhinus grallarius</i>	*3	E1	
Black-winged Stilt <i>Himantopus himantopus</i>	+5	P	
Black-fronted Dotterel <i>Elseya melanops</i>	+3	P	
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+2	P	
Caspian Tern <i>Sterna caspia</i>	+3	P	
Whiskered Tern <i>Chlidonias hybridus</i>	+3	P	RS
Rock Dove <i>Columba livia</i>	+3	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Common Bronzewing <i>Phaps chalcoptera</i>	+3	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia placida</i>	+3	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+3	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+3	P	
Galah <i>Eolophus roseicapillus</i>	+3	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+5	P	
Little Corella <i>Cacatua pastinator</i>	+5	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+3	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+2	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+3	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+3	P	
Crimson Rosella <i>Platycercus elegans</i>	+3	P	

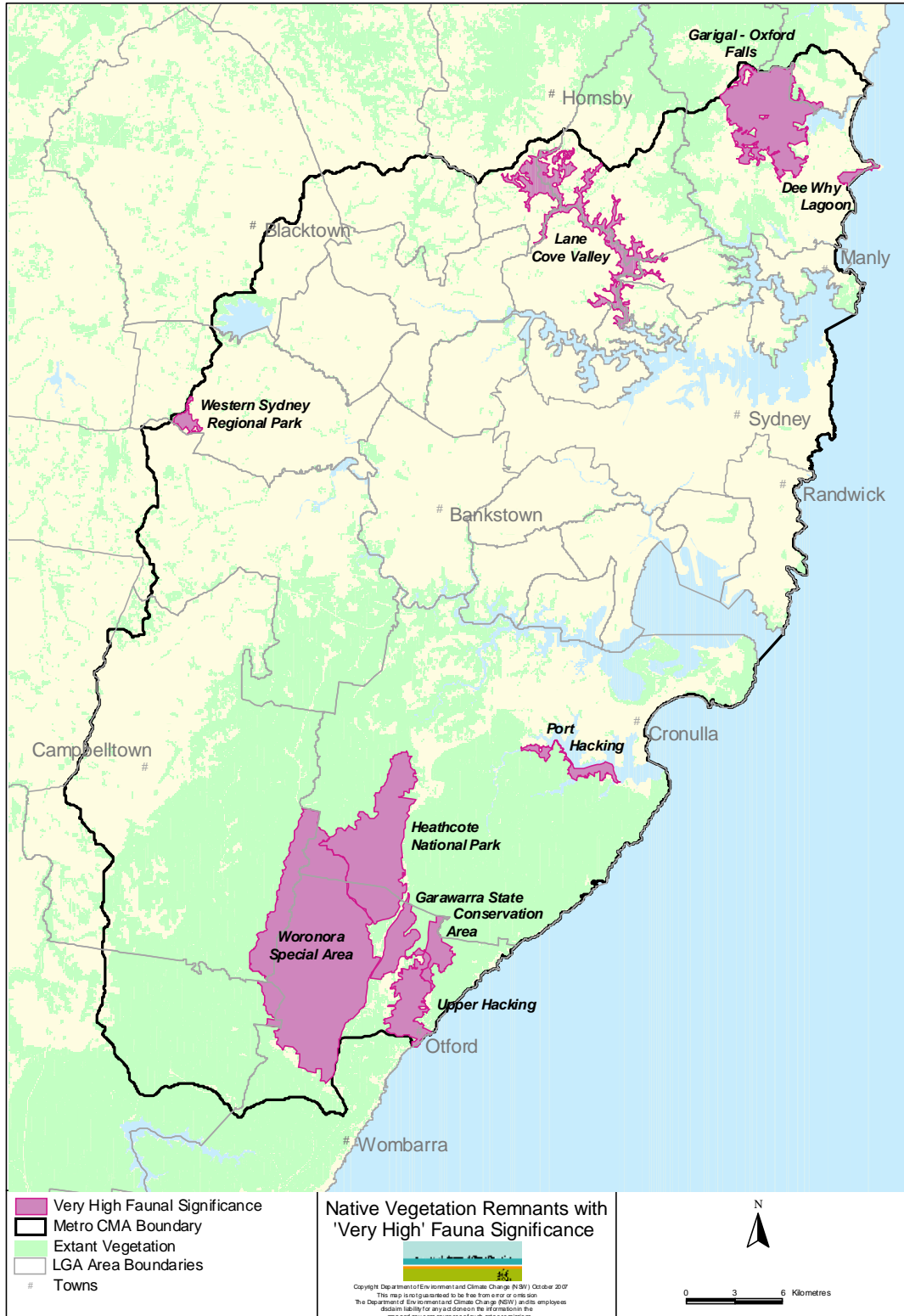
Species	Status	Legal Status	Regional Status
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Swift Parrot <i>Lathamus discolor</i>	+2	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+3	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+3	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+3	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+3	P	
Pacific Koel <i>Eudynamys orientalis</i>	+3	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+3	P	
Pheasant Coucal <i>Centropus phasianinus</i>	*1	P	RS
Southern Boobook <i>Ninox boobook</i>	+3	P	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Fork-tailed Swift <i>Apus pacificus</i>	+3	P	
Azure Kingfisher <i>Alcedo azurea</i>	*3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+3	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	*3	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+2	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+5	P	
Speckled Warbler <i>Chthonicola sagittata</i>	*3	V	
Weebill <i>Smicronis brevirostris</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+3	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	*3	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	*3	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+5	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Bell Miner <i>Manorina melanophrys</i>	+3	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	*3	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+3	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	

Species	Status	Legal Status	Regional Status
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+3	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+3	P	
Jacky Winter <i>Microeca fascians</i>	*3	P	RS
Scarlet Robin <i>Petroica boodang</i>	*3	P	RS
Flame Robin <i>Petroica phoenicea</i>	*3	P	RS
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	*3	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+3	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+3	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+3	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*3	P	RS
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Masked Woodswallow <i>Artamus personatus</i>	+5	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+3	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+3	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+2	P	
Australian Raven <i>Corvus coronoides</i>	+2	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	*3	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	*3	P	
Australian Pipit <i>Anthus australis</i>	+2	P	RS
House Sparrow <i>Passer domesticus</i>	+5	U	
Zebra Finch <i>Taeniopygia guttata</i>	+3	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+3	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+3	U	
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	+3	P	RS
European Goldfinch <i>Carduelis carduelis</i>	+3	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	

Species	Status	Legal Status	Regional Status
Tree Martin <i>Hirundo nigricans</i>	+2	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+3	P	
Little Grassbird <i>Megalurus gramineus</i>	+3	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	+3	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+4	P	RS
Silvereye <i>Zosterops lateralis</i>	+2	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	*3	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Squirrel Glider <i>Petaurus norfolcensis</i>	*	V	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+2	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinobus gouldii</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
Water-rat <i>Hydromys chrysogaster</i>	*4	P	RS
House Mouse <i>Mus musculus</i>	+2	U	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	
Feral Pig <i>Sus scrofa</i>	*2	U	
Feral Horse <i>Equus caballus</i>	+2	U	

Very High Ranking Fauna Sites

Nine sites of remnant bushland greater than 50ha in area within the CMA were identified as having a very high fauna ranking. The majority of these sites were of large or medium size, with one site covering a small area (Dee Why Lagoon–Long Reef Point). Six sites comprised land that is either totally or partially reserved as crown land for nature conservation and are managed by DECC. Although for one of these sites the amount of land managed by DECC comprises less than 10% of the total area (Upper Hacking). The remaining sites include Sydney Catchment Authority land (Woronora Special Area) or comprise predominantly crown reserve and/or council land (Port Hacking, Dee Why Lagoon–Long Reef Point).



Map ii: Native Vegetation Remnants with Very High Fauna Significance

Site 14: DEE WHY LAGOON AND LONG REEF POINT

Location:

Dee Why Lagoon including fringing remnant vegetation and the undeveloped coastal strip north to Long Reef Point (refer to Map ii).

Relative Area Size in CMA:

Small

Sub-catchment:

Northern Beaches

Local Government Area:

Warringah

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	27	30
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	64	70
Total	91	100

Environmental Setting:



Dee Why Lagoon backed by a suburban catchment. M. Schulz/DECC



End of Long Reef Point at high tide. M. Schulz/DECC



Swamp Sclerophyll Forest fringing Dee Why Lagoon. M. Schulz/DECC

This site comprises three distinct areas: a) small coastal lake and adjacent bushland (Dee Why Lagoon Wildlife Refuge), b) Long Reef Point and associated reef platforms, c) and Long Reef Dunes. Dee Why Lagoon is a small coastal lake comprising a water area covering 0.3 km², with important areas of seagrass meadows (NSW Department of Natural Resources 2007). It is one of the few large estuarine barrier lagoons remaining in a relatively good condition in the Sydney region (Warringah Council 2002a) and was once part of an ancient north-south river system formed during the Tertiary era (Taylor 1958). The lagoon is intermittently closed for a few days to several weeks depending on wind, tide and weather conditions. Breakout of the lagoon either occurs naturally as a result of wave action or water overtopping and scouring the sandbar or through mechanical opening (Warringah Council 1996, 2002a). Water quality is poor resulting from stormwater runoff from surrounding urban and industrial areas. The lagoon and surrounding bushland comprise the Dee Why Lagoon Wildlife Refuge, which supports a diverse array of vegetation communities, including five endangered ecological communities listed under the TSC Act 1995: Coastal Saltmarsh, Sydney Freshwater Wetlands, Swamp Sclerophyll Forest on Coastal Floodplains, Swamp Oak *Casuarina glauca* Floodplain Forest and Coastal Dune Forest (Warringah Council 2005a).

Long Reef Point was formerly an island and now is a tombolo with a unique profile and geology. The point forms an extensive promontory surrounded by the ocean on its eastern, northern and southern sides and rises to 36 m above sea level. It is comprised largely of Narrabeen Group shales that have been eroded to create the distinctive 'swept' headland profile rising to seaward cliffs and talus slopes (Sinclair Knights Merz 2005). Extensive intertidal rock platforms protrude a further 350 m seawards at Long Reef Point. Long Reef Point was predominantly cleared for grazing and agriculture (Reefcare 2004) and the coastal lagoon and wetland complex were largely filled in to form part of the Long Reef Golf Course. Remnant vegetation primarily occurs on the highly erodible slopes and steep cliff edges, including Spiny-headed Mat-rush *Lomandra longifolia* sedgeland on the southern side of the Point and Coast Banksia *Banksia integrifolia*–Coast Teatree *Leptospermum laevigatum* scrub on

the northern side of the point (Warringah Council 2005a). Patches of Coast Banksia woodland and the Kangaroo Grass *Themeda australis* grassland (covering 0.7 ha) that is listed as an Endangered Ecological Community under the TSC Act 1995 (*Themeda australis* grassland on sea cliffs and coastal headlands in the Sydney Basin) occur on the top of the point (Reefcare 2004; Warringah Council 2005a). Much of the remnant vegetation is heavily infested with Bitou Bush *Chrysanthemoides monilifera*.

The Long Reef Dunes are comprised of remnant primary dune vegetation on relict dunes behind Long Reef Beach linking Long Reef Point with Dee Why Lagoon. This remnant vegetation is bordered to the north by Long Reef Golf Course.

Overall the site is not directly linked to other conservation reserves by continuous vegetation (Warringah Council 2005b). The site supports four priority fauna habitats: forested wetland, freshwater wetland, saltwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports a diverse array of wetland and coastal plain fauna characteristic of the Northern Beaches, many of which are uncommon within the CMA. Additionally it supports one of the largest migratory shorebird roost and feeding area north of Botany Bay within the CMA.



Waterbirds congregating, Dee Why Lagoon. M. Schulz/DECC



A rare sight in the CMA, a group of ten threatened Sooty Oystercatchers. M. Schulz/DECC



The Australian Raven, a common bird within the site. M. Schulz

Priority Fauna Species Review:

There have been 161 vertebrate fauna species (excluding fish, marine species, vagrant shorebirds and escapees) documented within this area in the last 10 years: 136 birds, 10 mammals, 10 reptiles and five frogs. Of these three are considered endangered (although the presence of one species is the result of translocation; see below) and eight as vulnerable (these are discussed below). A further 35 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog (INTRODUCED)	Endangered	Translocation commenced in 1999 (DEC 2005b)	Crown: Long Reef Golf Course	No recent records apart from individuals that have been released into wetlands on Long Reef Headland (DEC 2005b; Enviroscape Consultants 2005).

Species	Threat Category*	Last Recorded	Tenure	Comments
Black Bittern	Vulnerable	2000 (Smith & Smith 2000a)	Warringah Council	Recent records are of one bird at Dee Why Lagoon in July 1998, and one in June 2000 (Smith & Smith 2000a; Atlas of NSW Wildlife records). Status in site uncertain.
**Australasian Bittern	Vulnerable	1984 (Atlas record)	Warringah Council	No recent records. The most recent record is of one bird at Dee Why Lagoon in about 1990 (Smith & Smith 2000a). Potentially may occasionally visit sedgeland areas of the lagoon.
Osprey	Vulnerable	2003 (Reidy 2003)	Widespread foraging habitat	Occasionally occurs along the shoreline and over Dee Why Lagoon (e.g. Reidy 2003; Way 2002; Smith & Smith 2000a). Many recent observations are likely to be of foraging birds ranging from the Narrabeen Lagoon nest site.
**Brolga	Vulnerable	Old record, exact year uncertain (Warringah Council 2002a)	Warringah Council	Extinct in the Sydney Basin Bioregion (Hoskin <i>et al.</i> 1991).
**Black-tailed Godwit	Vulnerable	1986 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	No recent records. A single record of a bird in 1986 at Long Reef (Smith & Smith 2000a). Vagrant.
Great Knot	Vulnerable	2000 (Woodford 2000)	Crown: NSW DPI Fisheries; Warringah Council	Rare summer visitor in small numbers. Recent records are of single birds at Long Reef in 2000, 1997 and 1995 (Woodford 2000; Gladwin 1997; Smith & Smith 2000a). Also occurs at Dee Why Lagoon, such as in 1995 (Smith & Smith 2000a).
Sanderling	Vulnerable	1998 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	Rare summer visitor in small numbers to Long Reef (Smith & Smith 2000a).
**Pied Oystercatcher	Vulnerable	1986 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	An occasional visitor to Long Reef and Dee Why Lagoon, with the most recent record being in May 1986 at Long Reef (Atlas of NSW Wildlife record; Smith & Smith 2000a).
Sooty Oystercatcher	Vulnerable	2007 (Current study)	Crown: NSW DPI Fisheries; Warringah Council	Along with Boat Harbour on the Kurnell Peninsula, Long Reef is the most important site in the CMA for this bird. Maximum of 17 birds have been recorded on exposed reef platforms of Long Point in the past 10 years (Atlas of NSW Wildlife records), with up to 25 individuals sighted in the past (Hoskin <i>et al.</i> 1991). Occasionally observed on Long Point Beach and at the entrance of Dee Why Lagoon. No nesting records.
**Lesser Sand-plover	Vulnerable	1996 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	A very rare summer visitor to Long Reef, with the most recent record being in 1996 (Smith & Smith 2000a) and five individuals in Jan 1992 (Atlas of NSW Wildlife record).
Greater Sand-plover	Vulnerable	1998 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	A very rare summer visitor to Long Reef, with the most recent record being in 1998 (Smith & Smith 2000a).

Species	Threat Category*	Last Recorded	Tenure	Comments
Little Tern	Endangered	1997 (Smith & Smith 2000a)	Crown: NSW DPI Fisheries; Warringah Council	A rare visitor that occasionally roosts amongst others birds on exposed reef platforms at Long Reef and the entrance of Dee Why Lagoon (Smith & Smith 2000a). No recent nesting records; formerly nested at Dee Why Lagoon in the 1940s (Smith & Smith 2000a).
**Superb Fruit-Dove (VAGRANT)	Vulnerable	1984 (Current study)	Warringah Council	Vagrant. One observed at Long Reef in June 1984 (Atlas of NSW Wildlife record).
Swift Parrot	Endangered	1998 (Gladwin 1998)	Warringah Council	Occasional visitor to the site when stands of Swamp Mahogany <i>Eucalyptus robusta</i> are in flower, such as 23 individuals in May 1998 (Gladwin 1998a).
Masked Owl	Vulnerable	2000 (Atlas record)	Warringah Council	Vagrant. The only recent documented record is of a single individual at Long Reef Headland in Aug 2000 (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Observed foraging on Coast Banksia, Swamp Mahogany and other flowering trees within the site (Current study). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995. ** Only recorded prior to 1997.

Additional Faunal Values: Long Reef Point supports a minor migratory shorebird roost and feeding area; Dee Why Lagoon is occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Disturbance due to high levels of public visitation; sedimentation within Dee Why Lagoon; disturbance by uncontrolled domestic dogs; water quality in Dee Why Lagoon; no continuously vegetated habitat link with remnant vegetation in adjacent reserves; loss of connecting habitat within the site; decline in submerged aquatic vegetation in Dee Why Lagoon; weed infestation, particularly from Bitou Bush on Long Reef Headland and behind Long Reef Beach; erosion on Long Reef Headland; loss or alteration of habitat on Long Reef Headland associated with golf course management activities; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands on Long Reef Headland; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Predation by domestic cats; predation by feral animals (such as the Black Rat, Fox and Feral Cat); dredging; habitat disturbance by Rabbits; entanglement in discarded fishing tackle; removal of intertidal invertebrates on Long Reef.



Remnant vegetation on Long Reef dunes linking Dee Why Lagoon and Long Reef Point. M. Schulz/DECC



Rock islet used by roosting shorebirds and other waterbirds separated from Long Reef Point at high tide. M. Schulz/DECC



Dee Why Lagoon entrance is occasionally blocked off from the sea. M. Schulz/DECC

Land Management:

The site comprises land primarily managed by Warringah Council, including Dee Why Lagoon Wildlife Refuge, Griffith Park and Long Reef Golf Club. The intertidal zone at Long Reef Point is managed by DPI Fisheries as part of the Long Reef Aquatic Reserve and includes all reef platforms below the mean high water mark (NSW DPI Fisheries 2007a).

References and Further Reading:

DEC (2005b), Envirosearch Consultancies (2005), Gladwin (1997, 1998a), Hoskin *et al.* (1991), Kate Low and Associates (2000), Keith (2004), LandArc (1999), Maxwell (1991), NSW Department of Natural Resources (2007), NSW DPI Fisheries (2007a), NSW National Parks and Wildlife Service (2001c), Reefcare (2004), Sinclair Knight Merz (2005), Smith & Smith (1997, 2000a), Taylor (1958), Warringah Council (1996, 2000, 2002a, b, 2005a, b, c), Way (2002), Woodford (2000).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – Sinclair Knight Merz (2005); +5 – J. Powell, Warringah Council, pers. comm.; +6 - Smith & Smith (2000a); +7 – Envirosearch Consultancies (2005); * - only recorded prior to 1997 (Atlas of NSW Wildlife records; Smith & Smith 2000a); *1 – only recorded prior to 1997 (Warringah Council 2002a); *2 – only recorded prior to 1997 (Smith & Smith 1997).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+7	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+7	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+7	E1	Released into site
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+7	P	
Peron's Tree Frog <i>Litoria peronii</i>	+7	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+7	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+7	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+7	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	*2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+7	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+7	P	
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+7	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+7	P	RS
King Quail <i>Coturnix chinensis</i>	*2	P	RS
Plumed Whistling-Duck <i>Dendrocygna eytoni</i>	*	P	
Musk Duck <i>Biziura lobata</i>	*	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Shelduck <i>Tadorna tadornoides</i>	*	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	

Species	Status	Legal Status	Regional Status
Mallard <i>Anas platyrhynchos</i>	+6	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Australasian Shoveler <i>Anas rhynchos</i>	+6	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	*	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+6	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	*	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
White-necked Heron <i>Ardea pacifica</i>	+6	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	*	P	
Cattle Egret <i>Ardea ibis</i>	+1	P	
Striated Heron <i>Butorides striatus</i>	+6	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+6	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+2	V	
Australasian Bittern <i>Botaurus poiciloptilus</i>	*	V	
Glossy Ibis <i>Plegadis falcinellus</i>	+6	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	*	P	
Royal Spoonbill <i>Platalea regia</i>	+4	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+3	P	
Osprey <i>Pandion haliaetus</i>	+3	V	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Letter-winged Kite <i>Elanus scriptus</i>	+7	P	
Black Kite <i>Milvus migrans</i>	+7	P	
Whistling Kite <i>Haliastur sphenurus</i>	*	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+6	P	RS
Spotted Harrier <i>Circus assimilis</i>	*2	P	
Swamp Harrier <i>Circus approximans</i>	+6	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+6	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+6	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+3	P	
Australian Hobby <i>Falco longipennis</i>	*	P	
Peregrine Falcon <i>Falco peregrinus</i>	+7	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Brolga <i>Grus rubicunda</i>	*1	V	

Species	Status	Legal Status	Regional Status
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+2	P	RS
Baillon's Crake <i>Porzana pusilla</i>	*	P	RS
Australian Spotted Crake <i>Porzana fluminea</i>	*	P	RS
Spotless Crake <i>Porzana tabuensis</i>	*	P	RS
Purple Swampphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+6	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Red-chested Button-quail <i>Turnix pyrrhorthorax</i>	*2	P	
Painted Button-quail <i>Turnix varia</i>	*	P	RS
Latham's Snipe <i>Gallinago hardwickii</i>	+1	P	RS
Black-tailed Godwit <i>Limosa limosa</i>	*	V	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Little Curlew <i>Numenius minutus</i>	*	P	
Whimbrel <i>Numenius phaeopus</i>	+3	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+6	P	RS
Marsh Sandpiper <i>Tringa stagnatilis</i>	*	P	RS
Common Greenshank <i>Tringa nebularia</i>	+3	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	*	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+1	P	RS
Wandering Tattler <i>Heteroscelus incanus</i>	+1	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+1	P	RS
Great Knot <i>Calidris tenuirostris</i>	+3	V	
Red Knot <i>Calidris canutus</i>	+6	P	RS
Sanderling <i>Calidris alba</i>	+3	V	
Red-necked Stint <i>Calidris ruficollis</i>	+1	P	RS
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	+1	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	+1	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	*	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Black-winged Stilt <i>Himantopus himantopus</i>	*	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	+1	P	RS
Grey Plover <i>Pluvialis squatarola</i>	*	P	RS
Red-capped Plover <i>Charadrius ruficapillus</i>	*	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Lesser Sand Plover <i>Charadrius mongolus</i>	*	V	
Greater Sand Plover <i>Charadrius leschenaultii</i>	+3	V	
Black-fronted Dotterel <i>Euseyonis melanops</i>	+1	P	
Banded Lapwing <i>Vanellus tricolor</i>	*2	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+6	P	
Kelp Gull <i>Larus dominicanus</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Gull-billed Tern <i>Sterna nilotica</i>	*	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	

Species	Status	Legal Status	Regional Status
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	*	P	
Common Tern <i>Sterna hirundo</i>	+1	P	RS
Arctic Tern <i>Sterna paradisaea</i>	*	P	
Little Tern <i>Sterna albifrons</i>	+3	E1	
Whiskered Tern <i>Chlidonias hybridus</i>	*	P	RS
White-winged Black Tern <i>Chlidonias leucopterus</i>	*	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*2	P	RS
Superb Fruit-Dove <i>Ptilinopus superbus</i>	*	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+7	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	*	P	
Little Corella <i>Cacatua pastinator</i>	+6	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+3	E1	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+7	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	*	P	
Pacific Koel <i>Eudynamis orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+7	P	
Pheasant Coucal <i>Centropus phasianinus</i>	*2	P	RS
Southern Boobook <i>Ninox boobook</i>	+1	P	
Masked Owl <i>Tyto novaehollandiae</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+7	P	
White-rumped Swiftlet <i>Collocalia spodiopygius</i>	+7	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Fork-tailed Swift <i>Apus pacificus</i>	+3	P	
Azure Kingfisher <i>Alcedo azurea</i>	+6	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+6	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	*2	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	

Species	Status	Legal Status	Regional Status
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+7	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+7	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	*2	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+6	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	*2	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+6	P	
White-fronted Chat <i>Epthianura albifrons</i>	*	P	RS
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+6	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	*2	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+3	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+6	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+7	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Singing Bushlark <i>Mirafrja javanica</i>	*2	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+2	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	*2	P	RS
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	*	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+6	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+3	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+3	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+2	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Long-nosed Bandicoot <i>Perameles nasuta</i>	+5	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	*2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	

Species	Status	Legal Status	Regional Status
House Mouse <i>Mus musculus</i>	+1	U	
Swamp Rat <i>Rattus lutreolus</i>	+7	P	RS
Black Rat <i>Rattus rattus</i>	+1	U	
Brown Rat <i>Rattus norvegicus</i>	+1	P	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 15: GARIGAL – OXFORD FALLS

Location:

Garigal NP east of Forest Way and adjacent bushland areas extending south to the Belrose, Oxford Falls and Cromer Heights area (refer to Map ii).

Relative Area Size in CMA:

Large

Sub-catchment:

Northern Beaches

Local Government Area:

Warringah and Pittwater

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	981	41
Crown Land	480	20
Commonwealth Land	0	0
Remaining Public Land	1	<1
Other	919	39
Total	2381	100

Environmental Setting:



Vegetation communities typical of Hawkesbury Sandstone environments are widespread in the site. M. Schulz/DECC



Deep Creek provides significant fauna habitat for species such as the Black Bittern. M. Schulz/DECC



Dense shrub heathland occurs widely within the site. M. Schulz/DECC

A large site located between the northern boundary of the CMA south to upslope of Narrabeen Lake, and the suburbs of Belrose, Oxford Falls, Beacon Hill, Cromer and Cromer Heights. Sections of land within the site have been excluded due to the presence of developed land, such as the Kimbriki Road–Kimbriki Recycling and Waste Disposal Centre area, the OPTUS Earth Station, Telstra Sydney Satellite Earth Station and various residential developments in the Belrose area. This site ranges from alluvial floodplains draining Hawkesbury Sandstone catchments along Deep and Middle Creeks to deeply incised gullies, slopes and plateaus associated with Hawkesbury Sandstones. As a result of the site's geomorphology a variety of vegetation communities occur. In low-lying areas on alluvial floodplains vegetation communities include several endangered ecological communities such as Swamp Sclerophyll Forest on Coastal Floodplains and Swamp Oak *Casuarina glauca* Floodplain Forest. Small patches of Coachwood closed forest dominated by Coachwood *Ceratopetalum apetalum* and Lillypilly *Acmena smithii* occur in sheltered gullies, such as in Deep Creek valley. Elsewhere the site is characterised by vegetation associated with Hawkesbury Sandstone gullies, slopes and plateaus including heathland dominated by such species as Scrub Sheoak *Allocasuarina distyla*, Heath Banksia *Banksia ericifolia* and Tick Bush *Kunzea ambigua*; and mallee woodland dominated by Yellow-topped Mallee Ash *Eucalyptus luehmanniana*, Red Bloodwood *Corymbia gummifera* and Sandstone Stringybark *E. oblonga*. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*, Camphor Laurel *Cinnamomum camphora* and Privet *Ligustrum* species as seen along Wakehurst Parkway. Watercourses are subject to poor water quality as a result of runoff from the Kimbriki Recycling and Waste Disposal Centre (Deep Creek) and stormwater runoff from surrounding residential areas. Fire frequency is high in parts of the site, with many fire ignitions attributed to arson. The site is immediately contiguous with the western edge of the Narrabeen Lake site. Elsewhere the site is tenuously linked to Ku-ring-gai Chase NP (within the Hawkesbury–Nepean CMA) in the Ingleside–Tumbledown Dick area and to the Middle Harbour Valley site across private land in the Belrose area. However, both of these tenuous links are broken by wide, busy roads i.e. Mona Vale Road in the former and Forest Way in the latter link. Additionally

part of the Narrabeen Lake site is separated from the current site by the busy Wakehurst Parkway. The site supports six priority fauna habitats: forested wetland, rainforest, alluvial forest and woodland, heathland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	High

Fauna Overview: A diverse array of fauna, including part of the North Sydney population of the Endangered Southern Brown Bandicoot, one of the only sites where the threatened Black Bittern is regularly observed within the CMA; populations of the threatened Rosenberg’s Goanna and Red-crowned Toadlet; and a range of other threatened and regionally significant fauna.



A variety of honeyeaters are prominent within the site, such as the White-cheeked Honeyeater. M. Schulz



This area supports part of the North Sydney population of the Endangered Southern Brown Bandicoot. M. Schulz



A diverse array of reptiles is present, including the uncommon Thick-tailed Gecko. M. Schulz

Priority Fauna Species Review:

There have been 207 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 140 birds, 30 reptiles, 28 mammals and nine frogs. Of these two are considered endangered and 11 are considered vulnerable (discussed below). A further 43 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2002 (Atlas record)	Private	Status uncertain. The only records are from adjacent to Woodward Street in Cromer Heights (Atlas of NSW Wildlife records). Likely to occur elsewhere within the site.
Red -crowned Toadlet	Vulnerable	2007 (Atlas record)	Crown: Garigal NP; Crown reserve	Status uncertain. Recorded from the headwaters of Deep Creek in Garigal NP and adjacent to Morgan Road in Belrose (Atlas of NSW Wildlife records). Formerly present in a new subdivision area in Beacon Hill adjacent to the site. There are likely to be more populations scattered in suitable habitat within the site, particularly in Garigal NP.
Rosenberg’s Goanna	Vulnerable	2007 (Atlas	Crown: Garigal	Scattered records within a

Species	Threat Category*	Last Recorded	Tenure	Comments
		record)	NP; Council reserves (Warringah LGA); private land	variety of heath dominated habitats, including Garigal NP, Red Hill Park, Deep Creek Reserve, along Morgan Road in Belrose and adjacent to new subdivisions in the Cromer Heights–Beacon Hill area, Moores Creek area and East Gordon Park (Atlas of NSW Wildlife records).
Black Bittern	Vulnerable	2005 (Cox 2005)	Crown reserve; Pittwater Council	Occasionally observed on the edge of Deep Creek, particularly adjacent to the Deep Creek Reserve picnic area (e.g. Brandwood 2002; Cox 2003, 2005; B. Law, DPI (Forests) pers. comm.).
Glossy Black-Cockatoo	Vulnerable	2007 (Coughlan 2007)	Widespread	Regularly observed in small numbers, particularly in Garigal NP (e.g. Coughlan 2007; Atlas of NSW Wildlife records).
Swift Parrot	Endangered	2007 (B. Cox pers. comm.)	NSW Academy of Sport ; Warringah Council	Occasional sightings, particularly when the Swamp Mahogany is in flower, for example two individuals were observed in May 2007 and three individuals in June 2007 (Swift Parrot Recovery Program database, DECC).
Powerful Owl	Vulnerable	1998 (NSW National Parks and Wildlife Service 1998b)	Widespread	Recorded as occurring within Garigal NP (NSW National Parks and Wildlife Service 1998b; Pittwater Council 1998a). Likely to be present in the Deep Creek valley.
Spotted-tailed Quoll	Vulnerable	2005 (Atlas record)	Crown: Garigal NP; Warringah Council	Status uncertain. One observed on Forest Way at Belrose adjacent to Garigal NP in Sept 2005 (Atlas of NSW Wildlife record).
Southern Brown Bandicoot	Endangered	2003 (Atlas record)	Crown: Garigal NP; private	A small number of records from Garigal NP (DEC 2006e). Also recorded from the Beacon Hill area (Atlas of NSW Wildlife record). The population in Garigal NP is showing signs of inbreeding depression and therefore is considered at high risk of extinction (DEC 2006e).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Likely to forage widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	2005 (Atlas record)	Crown reserve; private	Status uncertain. Detected using Anabat in the Beacon Hill area (Atlas of NSW Wildlife record).
Eastern Bentwing-bat	Vulnerable	2003 (Atlas record)	Widespread	Recorded from along Middle Creek and adjacent to Deep Creek (Atlas of NSW Wildlife records). Likely to occur widely across the site. No known roosts within the area.

Species	Threat Category*	Last Recorded	Tenure	Comments
Greater Broad-nosed Bat	Vulnerable	1997 (Atlas record)	Pittwater Council	Status uncertain. Recorded from the identification of ultrasonic signals using Anabat from adjacent to Deep Creek in Apr 1997 (Atlas of NSW Wildlife record).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Habitat loss; habitat continuity within the site; loss of habitat links with other nearby reserves; fire frequency and intensity; water quality, particularly runoff from waste disposal areas, such as Kimbriki Recycling and Waste Disposal Centre and stormwater run off since many of the watercourses originate inside urban areas; weed infestation; tree dieback; impacts associated with easements and road crossings; edge effect particularly from housing encroachment on to fringing bushland areas; impacts associated with high public visitation in parts of the site, such as erosion; loss of hollow-bearing trees; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; siltation of watercourses.

Moderate: Predation by feral predators (such as the Black Rat, Brown Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; competition for hollows by feral Honeybees *Apis mellifera*; bush rock removal; entanglement in discarded fishing tackle.



Fires are a prominent management issue within the site with respect to biodiversity. M. Schulz/DECC



Some parts of the site are heavily weed infested, such as along Wakehurst Parkway. M. Schulz/DECC



Habitat links with adjoining bushland areas are mostly interrupted by busy roadways, such as Mona Vale Road. M. Schulz/DECC

Land Management:

The tenure of this site is complex. A large component of the site comprises Garigal NP. Much of the remainder of the site comprises undeveloped private land, crown and council reserves within the Pittwater and Warringah LGAs including Deep Creek Reserve and Red Hill Park. Other bushland areas are located on Kimbriki Recycling and Waste Disposal Centre, Monash Country Club and NSW Academy of Sport. The site lies immediately adjacent to the Narrabeen Lakes site and both areas should be managed as a single unit to maintain biodiversity values. The maintenance of a continuous habitat link between the northern edge of the site and Ku-ring-gai NP in the Ingleside–Tumbledown Dick area and between the western edge of the site and the western block of Garigal NP in the Belrose area (see Middle Harbour Valley site) are to maintain the current biodiversity values of the area, such as maintenance of the population of the endangered Southern Brown Bandicoot. However, Mona Vale Road and Forest Way respectively form major barriers to the movement of many species. Measures are required for these habitat links to be effective to allow fauna movements across these high traffic volume roadways.

References and Further Reading:

Benson & Howell (1990), Brandwood (2002), Coughlan (2007), Cox (2003, 2005), DEC (2006e), Keith (2004), NSW National Parks and Wildlife Service (1998b, 2001c), Pittwater Council (1998a), Smith & Smith (2000b, 2007), Warringah Council (2005a, b, c).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – Smith & Smith (2007); +5 – NSW National Parks and Wildlife Service (1998a); +6 – Pittwater Council (1998); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records; DEC 2004).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Tusked Frog <i>Adelotus brevis</i>	+2	P	Unconfirmed
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+2	V	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Green Tree Frog <i>Litoria caerulea</i>	+6	P	RS
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+6	P	
Freycinet's Frog <i>Litoria freycineti</i>	*1	P	RS
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+6	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+6	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*1	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Thick-tailed Gecko <i>Underwoodisaurus millii</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+3	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+2	V	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+6	P	
White's Rock-skink <i>Egernia whitii</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	*1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Eastern Brown Tree Snake <i>Boiga irregularis</i>	+2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+3	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+2	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+6	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+5	P	
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	*1	P	RS
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Australian Brush-turkey <i>Alectura lathamii</i>	+2	P	RS
Black Swan <i>Cygnus atratus</i>	+4	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Mallard <i>Anas platyrhynchos</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+2	P	
Hardhead <i>Aythya australis</i>	+3	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+3	P	
Darter <i>Anhinga melanogaster</i>	+2	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+3	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+3	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+3	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+2	P	
Little Egret <i>Egretta garzetta</i>	+3	P	
Great Egret <i>Ardea alba</i>	+2	P	RS
Striated Heron <i>Butorides striatus</i>	+2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+3	V	
Australian White Ibis <i>Threskiornis molucca</i>	+2	P	
Pacific Baza <i>Aviceda subcristata</i>	+5	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+4	P	
Whistling Kite <i>Haliastur sphenurus</i>	+2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+2	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+3	P	RS
Little Eagle <i>Hieraetus morphnoides</i>	+3	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+5	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	*1	P	RS

Species	Status	Legal Status	Regional Status
Lewin's Rail <i>Rallus pectoralis</i>	*1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+5	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+2	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Rock Dove <i>Columba livia</i>	+2	U	
White-headed Pigeon <i>Columba leucomela</i>	+5	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+2	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	+2	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+2	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+4	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+2	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+2	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+3	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+2	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+3	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+3	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Swift Parrot <i>Lathamus discolor</i>	+3	E1	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+3	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+3	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+3	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+2	P	RS
Powerful Owl <i>Ninox strenua</i>	+5	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+2	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+2	P	
Azure Kingfisher <i>Alcedo azurea</i>	+4	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	

Species	Status	Legal Status	Regional Status
Sacred Kingfisher <i>Todiramphus sanctus</i>	+3	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+2	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+2	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
Rockwarbler <i>Origma solitaria</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+3	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+3	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+3	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	*1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Rose Robin <i>Petroica rosea</i>	+3	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+3	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+3	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+3	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+3	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+3	P	

Species	Status	Legal Status	Regional Status
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
Cicadabird <i>Coracina tenuirostris</i>	+6	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+3	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+1	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+3	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+3	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+2	P	
Australian Raven <i>Corvus coronoides</i>	+2	P	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+3	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Silvereye <i>Zosterops lateralis</i>	+2	P	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	+2	V	
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Common Dunnart <i>Sminthopsis murina</i>	+3	P	Unconfirmed
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Southern Brown Bandicoot <i>Isodon obesulus</i>	+2	E1	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+6	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+4	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+6	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+6	P	
Water-rat <i>Hydromys chrysogaster</i>	+5	P	RS

Species	Status	Legal Status	Regional Status
House Mouse <i>Mus musculus</i>	*1	U	
Swamp Rat <i>Rattus lutreolus</i>	+2	P	RS
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Brown Rat <i>Rattus norvegicus</i>	*1	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 16: HEATHCOTE NATIONAL PARK

Location:

This site comprises Heathcote NP bounded by Holsworthy Military Area and the Woronora Special Area on its western side and the suburbs off Engadine, Heathcote and Waterfall on its eastern side (refer to Map ii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Wollongong and Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	2713	95
Crown Land	84	3
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	45	2
Total	2841	100

Environmental Setting:



The extensive forested vistas of Heathcote NP. M Schulz/DECC



Woodland upslope of the Woronora River, with Black She-oak providing feed trees for the Glossy Black-cockatoo. M. Schulz/DECC



Gymeia Lilies in higher quality woodland along Heathcote Creek. M. Schulz/DECC

This site is located on the eastern side of the Woronora River and encompasses the Girronba and Heathcote Creek valley systems. It is located within a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). The site is located on the Woronora Plateau, an area dominated by Hawkesbury Sandstone characterised by steep valleys and ridges, rocky outcrops and streams which are punctuated by waterfalls and pools. Vegetation is dominated by exposed sandstone woodlands, sandstone gully forest, heath woodland with some eastern gully forests located along major watercourses, and patches of heathland (NSW National Parks and Wildlife Service 2000b, 2003a). Upland swamps occur predominantly in parts of Girronba Creek (e.g. Girronba Swamp), Arbon Valley, Moorabinda Gully and sections of upper Heathcote Creek (NSW National Parks and Wildlife Service 2000b). The majority of the area is protected as conservation reserve with comparatively little visitation compared to Royal NP that lies immediately to the east of this site. Much of the area was extensively and intensively burnt by wildfire in 2001 (DEC 2006d). The catchment of Heathcote Creek and other smaller creek systems to the north are partly located within urban and semi-urban land uses resulting in relatively poor water quality. The site supports two priority fauna habitats: freshwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Little	<i>Future Prospects:</i>	Little Change

Feral Birds:

Few

Further Significant
Fauna:

Moderate



The Red-crowned Toadlet is widespread in a variety of situations within the site. M. Schulz



This site supports one of the only known Eastern Horseshoe-bat roosts in the CMA. M. Schulz



The Short-beaked Echidna is widespread throughout Heathcote NP. M. Schulz

Fauna Overview: Supports a moderate diversity of fauna, many of which are limited in distribution within the CMA, including a number of species associated with heathlands, such as the threatened Rosenberg's Goanna and Eastern Pygmy-possum, and supports one of the only documented Eastern Horseshoe-bat roosts within the region.

Priority Fauna Species Review:

There have been 163 vertebrate fauna species (excluding fish and unconfirmed species) documented within this area in the last 10 years: 100 birds, 29 mammals, 26 reptiles and eight frogs. Of these one species is considered endangered and 12 species (excluding unconfirmed species) as vulnerable (discussed below). A further 38 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2007 (Current study)	Crown: DECC	Tadpoles were located in pools in Gironba Creek just downstream of Gironba
				Swamp in Sept 2007 (Current study). It is likely that this frog occurs elsewhere within the site.
Red-crowned Toadlet	Vulnerable	2007 (Current study)	Crown: DECC	Scattered records in minor drainage lines and depressions associated with a variety of vegetation associations, including several individuals heard calling from a temporary pool under the water supply pipeline SW of Goanna Track junction in Sept 2007 (Current study, Atlas of NSW Wildlife records).
Rosenberg's Goanna	Vulnerable	2007 (Current study)	Crown: DECC	Status uncertain. One record from heath woodland along Bullawarring Track in Sept 2007 (Current study) and several records of roadkills on the Southern Freeway immediately to the east of the site (Atlas of NSW Wildlife records; K. Madden and M. Schulz, DECC, unpublished records).
Broad-headed Snake	Endangered	1998 (Atlas	Crown: DECC	Status uncertain. The only

Species	Threat Category*	Last Recorded	Tenure	Comments
		record)		record is immediately adjacent to the Woronora Dam Road in Apr 1998 (Atlas of NSW Wildlife record). Likely to be more widespread than documented records indicate.
Glossy Black-Cockatoo	Vulnerable	2000 (Anyon-Smith 2006)	Crown: DECC	A rare visitor to the site (Anyon-Smith 2006).
Gang-gang Cockatoo	Vulnerable	2005 (Anyon-Smith 2006)	Crown: DECC	Rare visitor in sandstone gully forest and woodland (Anyon-Smith 2006).
Powerful Owl	Vulnerable	1998 (Atlas record)	Crown: DECC	Status uncertain, particularly after the 2001 wildfire. One record from taller forest along the Woronora River in May 1998 (Atlas of NSW Wildlife record).
Sooty Owl	Vulnerable	1998 (Atlas record)	Crown: DECC	Status uncertain, particularly after the 2001 wildfire. Two records from taller forest along the Woronora River in May 1998 (Atlas of NSW Wildlife records).
Koala	Vulnerable	2005 (Atlas record)	Crown: DECC	Scattered records mainly from the middle sections of the site such as along Girronba Creek, adjacent to Marks Lookout and Heathcote Creek area west of Heathcote (Atlas of NSW Wildlife records).
Eastern Pygmy-possum	Vulnerable	2005 (Atlas record)	Crown: DECC	Pitfall trapping results suggest that this species is moderately common and widely distributed within the site (Tulloch 2003; D. Andrew, DECC, pers. comm.; Atlas of NSW Wildlife records).
Grey-headed Flying-fox	Vulnerable	1998 (Atlas record)	Crown: DECC	Forages widely across the site in a variety of habitats when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Crown: DECC	Scattered records along Girronba and Heathcote Creeks (Atlas of NSW Wildlife records). Two individuals recorded roosting in the Dingo Tunnel in Sept 2007 (Current study). There are likely to be other roosts present within the site.
Southern Myotis	Vulnerable	1999 (Atlas record)	Crown: DECC	One individual recorded roosting in the Dingo Tunnel in Oct 1999 (Atlas of NSW Wildlife record). None were seen roosting in this location in the current study. Likely to be widespread along the larger watercourses within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	2000 (Atlas record)	Crown: DECC	Unconfirmed record by Anabat from along the Woronora Dam Road (Atlas of NSW Wildlife record). The

Species	Threat Category*	Last Recorded	Tenure	Comments
				ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995.

Additional Faunal Values: Multi-species cave-dwelling bat roost located in Dingo Tunnel west of Girronba Creek.



Regenerating vegetation which was intensively burnt in the 2001 wildfire. M. Schulz/DECC



There are number of low-key walking tracks traversing parts of Heathcote NP. M. Schulz/DECC



A number of high-voltage powerline easements traverse sections of Heathcote NP. M. Schulz/DECC

Identified Threats to Fauna Values:

High: Impacts of high intensity fire; loss of habitat in the adjoining Holsworthy Military Reserve; water quality of the major watercourses, particularly from stormwater runoff from Waterfall, Heathcote and Engadine; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); bush rock removal and the illegal collection of reptiles, particularly the Broad-headed Snake; disturbance by uncontrolled domestic dogs; impacts associated with easements within the area; competition for hollows by feral Honeybees *Apis mellifera*.

Land Management:

This site primarily comprises Heathcote NP which is managed by DECC, with a small section of Crown Reserve forming Camp Coutts Scout Camp.

References and Further Reading:

Andrew (2001), Anyon-Smith (2006), DEC (2004a), DECC (2007a, b), Keith (2004), NSW National Parks and Wildlife Service (2000a, b, 2001c, d, e, 2003a), Parnaby (2001), Pennay *et al.* (2004), Tulloch (2003).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Anyon-Smith (2006); +5 – D. Andrew, DECC, unpublished data; +6 – Parnaby (2001); +7 – G. Madani, DECC, pers. comm.; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife); *2 – only recorded prior to 1997 (Anyon-Smith 2006).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+1	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+5	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Freycinet's Frog <i>Litoria freycineti</i>	+2	P	RS
Lesueur's Frog <i>Litoria lesueurii</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+2	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+2	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Southern Death Adder <i>Acanthophis antarcticus</i>	+2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Red-naped Snake <i>Furina diadema</i>	+2	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+2	E1	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+7	P	RS
Birds:			
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+4	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+4	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
Black-shouldered Kite <i>Elanus axillaris</i>	+2	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+4	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+4	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+4	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+4	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+4	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+2	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	+4	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+4	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+2	V	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+4	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+2	P	
Sooty Owl <i>Tyto tenebricosa</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+4	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+4	P	
Fork-tailed Swift <i>Apus pacificus</i>	+4	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+4	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Pilotbird <i>Pycnoptilus floccosus</i>	+1	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+1	P	RS
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+3	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+2	P	RS
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Scarlet Robin <i>Petroica boodang</i>	+1	P	RS
Rose Robin <i>Petroica rosea</i>	*2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+4	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+4	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+4	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	

Species	Status	Legal Status	Regional Status
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	+2	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+4	P	
Silvereve <i>Zosterops lateralis</i>	+1	P	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Common Dunnart <i>Sminthopsis murina</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Wombat <i>Vombatus ursinus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+2	V	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
Eastern Horseshoe-bat <i>Rhinolophus megaphyllus</i>	+1	P	RS
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Swamp Rat <i>Rattus lutreolus</i>	+2	P	RS
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 17: LANE COVE VALLEY

Location:

Lane Cove River and adjacent bushland areas from Boronia Park upstream to the river's headwaters in Pennant Hills, Wahroonga, Turramurra and Pymble including Lane Cove NP, Pennant Hills Park, Twin Creeks Reserve, Sheldon Forest, Blue Gum Reserve and the Field of Mars Wildlife Refuge (refer to Map ii).

Relative Area Size in CMA:

Large

Sub-catchment:

Lane Cove River

Local Government Area:

Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Ryde and Willoughby

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	628	40
Crown Land	129	8
Commonwealth Land	0	0
Remaining Public Land	3	<1
Other (including land managed by CSIRO)	827	52
Total	1586	100

Environmental Setting:



Lane Cove River at Sugarloaf Point. M. Schulz/DECC



The bushland is dominated by Hawkesbury Sandstone vegetation communities. M. Schulz/DECC



Blackbutt dominated tall forest in Sheldon Forest, Pymble. M. Schulz/DECC

A large irregularly shaped site as a result of remnant vegetation being primarily restricted to gullies and along watercourses. It extends from just north of Sydney Harbour almost to the northern boundary of the CMA. In sections of the site, remnant vegetation is less than 100m wide with some of this band being impacted by encroachment from adjacent houses. This large area ranges from alluvial floodplains of Hawkesbury Sandstone and Wianamatta Group sediments in the lower reaches of the Lane Cove River to deeply incised gullies with rocky outcrops and plateaux associated with Hawkesbury Sandstones to Wianamatta Group shales in the headwaters. As a result of the diverse geomorphology a variety of vegetation communities occur. Those associated with the Wianamatta group shales in the headwaters include remnant patches of the endangered ecological community Blue Gum High Forest characterised by Sydney Blue Gum *Eucalyptus saligna*, Blackbutt *E. pilularis* and Grey Ironbark *E. paniculata*. Well developed gully forest dominated by Blackbutt and stands of Sydney Blue Gum occur along gullies and creeklines where downwashed Wianamatta Group clay deposits are present. In some gullies patches of closed forest occur dominated by wet forest species such as Hairy Clerodendrum *Clerodendrum tomentosum*, Muttonwood *Rapanea variabilis*, Cheese Tree *Glochidion ferdinandi*, Blueberry Ash *Elaeocarpus reticulatus*, Black Wattle *Callicoma serratifolia*, Sweet Pittosporum *Pittosporum undulatum* and Coachwood *Ceratopetalum apetalum*. Vegetation leading down to the Lane Cove River and some of its tributaries are characterised by vegetation associated with Hawkesbury Sandstone gullies and slopes. Some patches of Sydney Turpentine *Syncarpia glomulifera*-Ironbark Forest (an endangered ecological community) occurs on Ashfield Shale soils on the slopes above the Lane Cove River. The tidal sections of the Lane Cove River and smaller tributaries are lined with a variable width band of mangroves dominated by Grey Mangrove *Avicennia marina*, in places backed by small areas of

coastal saltmarsh (an endangered ecological community), Common Reed *Phragmites australis* wetlands and Swamp Oak *Casuarina glauca* Floodplain Forest (an endangered ecological community). Much of the forest growing in the headwaters was extensively logged in the past resulting in relatively few well developed hollows being present in the regenerating forests. In much of the site, except for some of the larger reserves such as parts of Lane Cove NP, Pennant Hills Park and Twin Creeks Reserve housing development occurs on most less steeply inclined terrain either immediately abutting watercourses or on the edge of incised gullies. Watercourses are subject to poor water quality as a result of stormwater runoff. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*, Camphor Laurel *Cinnamomum camphora* and Privet *Ligustrum* species. Fire frequency is high, with many fire ignitions attributed to arson. The Lane Cove Valley is not directly linked to nearby conservation reserves. The site supports six priority fauna habitats: forested wetland, rainforest, alluvial forest and woodland, grassy woodland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change



Fauna along many watercourses are dominated by wet forest species, such as the Satin Bowerbird. M. Schulz



The Eastern Water Dragon is a common reptile along watercourses in the site. M. Schulz/DECC



An increasingly common sight along gullies are the mounds of the Australian Brush-turkey. M. Schulz

<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate
---------------------	----------	-----------------------------------	----------

Fauna Overview: A diverse array of fauna occurs, including a number of threatened species such as the Powerful Owl, Barking Owl, Red-crowned Toadlet and Eastern Bentwing-bat.

Priority Fauna Species Review:

There have been 231 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 166 birds, 28 reptiles, 28 mammals and nine frogs. Of these one is considered as endangered, one part of an endangered population and nine (excluding vagrants and unconfirmed species) are considered vulnerable (discussed below). A further 45 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2002 (Atlas record)	Crown: Lane Cove NP; Kuring-gai Council	Recorded from along drainage lines, in soaks and small sandstone quarries in a number of locations within Lane Cove NP and adjacent areas such as Twin Creeks Reserve, adjacent to the M2

Species	Threat Category*	Last Recorded	Tenure	Comments
				Motorway and the University of Technology, Ku-ring-gai Campus (DEC 2004b; Atlas of NSW Wildlife records).
**Cotton Pygmy-goose (VAGRANT)	Endangered	1992 (Morris 2003)	Crown: Lane Cove NP; Lane Cove Council and City of Willoughby	A vagrant to the Sydney region (Hoskin <i>et al.</i> 1991; Morris 2003). One adult female was present over a number of months between July 1991 and Nov 1992 in a tidal backwater channel of Stringybark Creek and a nearby weir in Lane Cove NP (McAllan 1992; Morris 2003).
Black Bittern	Vulnerable	2004 (Hayes 2004)	City of Ryde	Status uncertain. One bird observed near the confluence of Buffalo and Strangers Creeks in the Field of Mars Wildlife Refuge (Hayes 2004).
Australasian Bittern (UNCONFIRMED)	Vulnerable	2001 (Atlas record)	Crown: Lane Cove NP	Status uncertain. One bird was reported from the edge of a weir in Lane Cove NP in Jan 2001 (Atlas of NSW Wildlife record).
Osprey	Vulnerable	2000 (Gladwin 2000)	Crown: Lane Cove NP; Lane Cove Council and City of Willoughby	Rare visitor to the tidal sections of the Lane Cove River, such as the Mowbray Park area (Burton 2004). One observed in Lane Cove NP in Feb 2000 (Gladwin 2000).
Superb Fruit-Dove (VAGRANT)	Vulnerable	2004 (Vella 2004a)	Ku-ring-gai Council	Vagrant. One female observed in June and July 2004 at Sheldon Forest, with other records in the 1990s from the area (Vella 2004c; DEC 2004b).
**Rose-crowned Fruit-Dove (VAGRANT)	Vulnerable	1996 (Gladwin 1996)	Crown: Lane Cove NP	Vagrant. The only documented records are of one immature seen in Lane Cove NP in Aug 1986 and one that flew into a window of a house in Hawthorne Avenue, Chatswood West adjacent to Lane Cove NP in Nov 1996 (Gladwin 1996; Burton 2004).
Glossy Black-Cockatoo (UNCONFIRMED)	Vulnerable	2000 (Atlas record)	Crown: Lane Cove NP	Status uncertain. Several Birds Australia records from the Lane Cove NP area. However, this species was not listed as occurring in the site by Burton (2004) or DEC (2004b).
Gang-gang Cockatoo	Endangered Population	2003 (Atlas record)	Crown: Lane Cove NP	Status uncertain. The Endangered Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGAs occurs in Lane Cove NP, Pennant Hills Park and other forested gullies in the area (DECC 2005). A small group occurs in the upper Lane Cove valley (Burton 2004). Surprisingly few documented records, for example, two individuals observed in the Cheltenham section of Lane Cove NP in

Species	Threat Category*	Last Recorded	Tenure	Comments
Swift Parrot	Endangered	2000 (Atlas record)	Crown: Lane Cove NP, University of Technology; Ku-ring-gai Council	Apr 2005 (Montgomery 2005). Rare visitor. The only recent documented recent record is of two individuals feeding on the flowers of Sydney Blue Gum at the University of Technology, Ku-ring-gai Campus, West Lindfield in Apr 2002 (Burton 2002). In 1958 many birds visited the Blue Gum Creek Reserve (Burton 2004).
Powerful Owl	Vulnerable	2007 (Vella 2007a)	Widespread	Scattered throughout the site, with at least two pairs present within Lane Cove NP (DEC 2004b).
Barking Owl	Vulnerable	2007 (Vella 2007a)	Crown: Lane Cove NP; Ku-ring-gai Council and City of Willoughby	Rare visitor. One bird present in mid 2007 in the Blue Gum Reserve, Chatswood West - West Lindfield (Charles 2007; Vella 2007a). Also recorded from adjacent to Lane Cove NP in 2000 (DEC 2004b).
**Eastern Bristlebird	Endangered	Early 1930s (Burton 2004)	Uncertain	Locally extinct. Present in the upper Lane Cove valley in the early 1930s (Burton 2004).
**Eastern Pygmy-possum	Vulnerable	1972 (DEC 2004b)	City of Willoughby	Status uncertain. The only record is from the site was along Stringybark Creek in 1972 (DEC 2004b).
Yellow-bellied Glider (UNCONFIRMED)	Vulnerable	1999 (DEC 2004b)	Uncertain	Unconfirmed record from just outside Lane Cove NP in 1999 by a consultant (DEC 2004b). Systematic fauna surveys in Lane Cove NP failed to locate this species (DEC 2004b). Therefore, the record is considered to have low reliability.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Likely to forage widely across the site when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Yellow-bellied Sheath-tail-bat (VAGRANT)	Vulnerable	2005 (Basham 2005)	Crown: Sheldon Forest	Ultrasonic calls recorded by Anabat from Sheldon Forest (Basham 2005). This species is regarded as a vagrant to the CMA (DECC 2007b; H. Parnaby, DECC, pers. comm.).
East-coast Freetail-bat	Vulnerable	2005 (Basham 2005)	Crown: Sheldon Forest	Ultrasonic calls recorded by Anabat from Sheldon Forest (Basham 2005).
Eastern Bentwing-bat	Vulnerable	2007 (Atlas record)	Widespread	Scattered records throughout the area (DEC 2004b; Atlas of NSW Wildlife records). Small roost of 30+ individuals located in the ceiling of a culvert under The Comenarra Parkway adjacent to Bradley and Twin Creeks Reserves in July 1997 (Atlas of NSW Wildlife records).
Little Bentwing-bat	Vulnerable	2005 (Basham	Crown:	Ultrasonic calls recorded by

Species	Threat Category*	Last Recorded	Tenure	Comments
		2005)	Sheldon Forest	Anabat from Sheldon Forest (Basham 2005).
Southern Myotis (UNCONFIRMED)	Vulnerable	2006 (Biosphere Environmental Consultants 2006)	City of Ryde	Status uncertain. No individuals were trapped or detected in the systematic fauna survey of Lane Cove NP (DEC 2004b). The only records are from the identification of ultrasonic signals using Anabat from the mouth of Buffalo Creek in the Field of Mars Wildlife Refuge in 2006 (Biosphere Environmental Consultants 2006). The ultrasonic signals of this bat are readily confused with the more common long-eared bats (e.g. Pennay <i>et al.</i> 2004; L. Lumsden, Arthur Rylah Institute, Victoria, pers. comm.). Therefore, until individuals are trapped this species must be regarded as unconfirmed within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Cave-dwelling bat roost located in culvert under The Comenarra Parkway (Note: There are likely to be other roosts present under bridges within the site).

Identified Threats to Fauna Values:

High: Habitat loss particularly from landfill operations; habitat continuity within the site; no continuous habitat links with other conservation reserves within the local region; water quality, particularly stormwater run off; weed infestation; tree dieback; impacts associated with easements and road crossings; high edge effect particularly from housing encroachment on to fringing bushland areas; impacts associated with high public visitation in parts of the site, such as erosion; loss of hollow-bearing trees; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; mangrove encroachment into saltmarsh and Common Reed wetlands; fire frequency and intensity; competition for hollows by feral Honeybees *Apis mellifera*; bush rock removal; entanglement in discarded fishing tackle.



The site has a high edge effect impacting on biodiversity values of the area. M. Schulz/DECC



Numerous walking tracks traverse bushland across much of the site. M. Schulz/DECC



The site is bisected by a number of busy roads, such as Lady Game Drive. M. Schulz/DECC

Land Management:

The tenure of this site is complex. A large component of the site comprises Lane Cove NP. Much of the remainder of the site comprises crown and council reserves within the Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Ryde and Willoughby LGAs including Pennant Hills Park, Thornleigh Park, Twin Creeks Reserve, Rofe Park, Sheldon Forest, Fiddens Wharf Reserve, Blue Gum Reserve, Fullers

Park, Ferndale Park, Mowbray Park, Magdala Park, Blackman Park, Buffalo Creek Reserve, Field of Mars Wildlife Refuge, and Boronia Park. Other bushland areas are located on private land, a number of golf courses and vegetated sections of Macquarie University, the CSIRO National Measurement Laboratory and the University of Technology Ku-ring-gai campus. The creation of a habitat link between this site and the Berowra Valley Bushland Park in the Hornsby LGA within the Hawkesbury-Nepean CMA would further ensure or even increase the biodiversity values within the site.

References and Further Reading:

Basham (2005), Benson & Howell (1995), Biosphere Environmental Consultants (2006), Burton (2002, 2004), Burton & Hancock (2007), Charles (2007), City of Ryde (2007), Clarke & Benson (1987), DEC (2004b, 2005a), DECC (2007b), Gladwin (1996, 2000), Hayes (2004), Goth *et al.* (2006), Hornsby Shire Council (2002, 2004, 2006), Hoskin *et al.* (1991), Ives *et al.* (2006), Kavanagh (2004), Keith (2004), Ku-ring-gai Council (2006), Martyn (1994), McAllan (1992), McDonald *et al.* (2002), McKay *et al.* (1999), Montgomery (2005), Morris (2003), NSW National Parks and Wildlife Service (1998a, 2001c, 2002b), Pennay *et al.* (2004), Sansom (1991), Vella (2004c, 2007a), White (2001, 2006a).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife and DEC (2004b); +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – White (2001); +5 – records from Ku-ring-gai Council; +6 – Burton (2004); +7 – Biosphere Environmental Consultants (2006); +8 – City of Willoughby records; +9 – Basham (2003); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records; DEC (2004b)); *2 – only recorded prior to 1997 (Birding-aus website & Birdline NSW); *3 - only recorded prior to 1997 (Burton 2004); *4 - only recorded prior to 1997 (Hoskin *et al.* 1991).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); EP – Part of an Endangered Population (under the TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+4	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Smooth Toadlet <i>Uperoleia laevigata</i>	+2	P	RS
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Kuferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+4	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+4	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	*1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Burton's Legless-lizard <i>Lialis burtonis</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	

Species	Status	Legal Status	Regional Status
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
White's Rock-skink <i>Egernia whitii</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+2	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+4	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Marsh Snake <i>Hemiaspis signata</i>	+7	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+4	P	
Birds:			
Australian Brush-turkey <i>Alectura lathami</i>	+8	P	RS
Black Swan <i>Cygnus atratus</i>	+2	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Cotton Pygmy-goose <i>Nettapus coromandelianus</i>	*3	E1	
Mallard <i>Anas platyrhynchos</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+2	P	
Hardhead <i>Aythya australis</i>	+2	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+2	P	
Darter <i>Anhinga melanogaster</i>	+2	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+2	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+6	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+2	P	RS
Little Egret <i>Egretta garzetta</i>	+2	P	
White-necked Heron <i>Ardea pacifica</i>	+6	P	
Great Egret <i>Ardea alba</i>	+7	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+7	P	
Cattle Egret <i>Ardea ibis</i>	+3	P	
Striated Heron <i>Butorides striatus</i>	+2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+2	P	RS
Black Bittern <i>Ixobrychus flavicollis</i>	+2	V	

Species	Status	Legal Status	Regional Status
Australasian Bittern <i>Botaurus poiciloptilus</i>	+2	V	Unconfirmed
Australian White Ibis <i>Threskiornis molucca</i>	+6	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+6	P	
Royal Spoonbill <i>Platalea regia</i>	+2	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+2	P	
Osprey <i>Pandion haliaetus</i>	+6	V	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+3	P	
Whistling Kite <i>Haliastur sphenurus</i>	+6	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+6	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+3	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+3	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+6	P	RS
Brown Falcon <i>Falco berigora</i>	+2	P	
Australian Hobby <i>Falco longipennis</i>	+3	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+6	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+2	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+2	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+2	P	
Eurasian Coot <i>Fulica atra</i>	+2	P	
Red-chested Button-quail <i>Turnix pyrrhotorax</i>	*4	P	
Common Sandpiper <i>Actitis hypoleucos</i>	*4	P	RS
Black-winged Stilt <i>Himantopus himantopus</i>	+2	P	
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+2	P	
Rock Dove <i>Columba livia</i>	+2	U	
White-headed Pigeon <i>Columba leucomela</i>	+2	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+6	P	RS
Emerald Dove <i>Chalcophaps indica</i>	+3	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	*1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	*1	P	RS
Superb Fruit-Dove <i>Ptilinopus superbus</i>	+3	V	
Rose-crowned Fruit-Dove <i>Ptilinopus regina</i>	*2	V	
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+6	P	RS
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	+2	V	Unconfirmed
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+2	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+2	EP	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+2	P	

Species	Status	Legal Status	Regional Status
Little Corella <i>Cacatua pastinator</i>	+2	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+2	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+3	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Swift Parrot <i>Lathamus discolor</i>	+3	E1	
Oriental Cuckoo <i>Cuculus saturatus</i>	+3	P	RS
Pallid Cuckoo <i>Cuculus pallidus</i>	+7	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+2	P	RS
Powerful Owl <i>Ninox strenua</i>	+2	V	
Barking Owl <i>Ninox connivens</i>	+3	V	
Southern Boobook <i>Ninox boobook</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+7	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+2	P	
Fork-tailed Swift <i>Apus pacificus</i>	+6	P	
Azure Kingfisher <i>Alcedo azurea</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Noisy Pitta <i>Pitta versicolor</i>	+4	P	RS
Superb Lyrebird <i>Menura novaehollandiae</i>	*1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+2	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
Eastern Bristlebird <i>Dasyornis brachypterus</i>	*3	E1	Locally extinct
Rockwarbler <i>Origma solitaria</i>	*3	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	

Species	Status	Legal Status	Regional Status
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Bell Miner <i>Manorina melanophrys</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+2	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+7	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+5	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+2	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Jacky Winter <i>Microeca fascinans</i>	+7	P	RS
Scarlet Robin <i>Petroica boodang</i>	*1	P	RS
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Spectacled Monarch <i>Monarcha trivirgatus</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	*1	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+2	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+2	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
Cicadabird <i>Coracina tenuirostris</i>	+3	P	
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	

Species	Status	Legal Status	Regional Status
Australasian Figbird <i>Sphecotheres vieilloti</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+6	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+2	P	
Australian Raven <i>Corvus coronoides</i>	+2	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+6	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+6	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Tree Martin <i>Petrochelidon nigricans</i>	+6	P	
Fairy Martin <i>Petrochelidon ariel</i>	+7	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Golden-headed Cisticola <i>Cisticola exilis</i>	+7	P	RS
Silvereye <i>Zosterops lateralis</i>	+2	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+4	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	*1	V	
Feathertail Glider <i>Acrobates pygmaeus</i>	+2	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Yellow-bellied Glider <i>Petaurus australis</i>	+2	V	Unconfirmed
Greater Glider <i>Petauroides volans</i>	+4	P	Unconfirmed
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
Little Red Flying-fox <i>Pteropus scapulatus</i>	*1	P	
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>	+9	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+9	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Little Bent-wing Bat <i>Miniopterus australis</i>	+9	V	
Southern Myotis <i>Myotis macropus</i>	+7	V	Unconfirmed

Species	Status	Legal Status	Regional Status
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+4	P	
Water-rat <i>Hydromys chrysogaster</i>	+4	P	RS
House Mouse <i>Mus musculus</i>	+2	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 18: UPPER HACKING

Location:

Upper Hacking River catchment bordered to the south by the CMA boundary along Lawrence Hargrave Drive, to the west by Helensburgh and the east by the Illawarra Railway, Otford and the coast south of Bulgo (refer to Map ii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Hacking River

Local Government Area:

Wollongong

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	95	11
Crown Land	110	13
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	671	76
Total	877	100

Environmental Setting:



Subtropical rainforest - important fauna habitat in this site. M. Schulz/DECC



One of numerous waterfalls within the Upper Hacking. M. Schulz, DECC



Disused railway tunnels are important roost habitat for threatened cave-dwelling bats. M. Schulz/DECC

The site comprises a rich mix of vegetation types associated with the Hawkesbury Sandstone underlain by shales, claystones and sandstones of the Narrabeen Group including heathland; littoral, temperate and subtropical rainforest; dry and wet sclerophyll forest. This site supports some of the most extensive areas of subtropical and littoral rainforest within the CMA. The area forms an important component of the Illawarra Escarpment Moist Forest Fauna Linkage connecting rainforest and wet sclerophyll forest habitats in Royal NP to extensive areas of similar habitat in the Illawarra (Robinson 1977; DEC 2003). Much of the area has been extensively logged in the past (Quality Environmental Management 1984), resulting in few well developed hollows being present in regenerating forests. The site supports two priority fauna habitats: rainforest and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: Important for subtropical rainforest and wet sclerophyll species; many of which are highly restricted in distribution within the CMA, such as the most southerly roost recorded for the threatened Little Bentwing-bat and regionally significant species such as the Emerald Dove, Logrunner, Green Catbird, Yellow-throated Scrubwren and Sooty Owl.



The Golden-crowned Snake is relatively common in this site. N. Williams



The site is an important corridor for species such as the Topknot Pigeon. M. Schulz



Two roosts of the threatened Large-footed Myotis were located in this site. M. Schulz

Priority Fauna Species Review:

There have been 148 vertebrate fauna species (excluding fish and marine species) documented within this area in the last 10 years: 94 birds, 27 mammals, 18 reptiles and nine frogs. Of these one species is considered endangered and eight species as vulnerable (discussed below). A further 33 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Stuttering Frog	Endangered	1997 (DECC 2007b)	Uncertain	Formerly occurred in creeks around Helensburgh. There is a record from the Helensburgh area in 1997 (DECC 2007b). However, an intensive search in 1999-2000 failed to locate this species (DEC 2002b).
Sooty Oystercatcher	Vulnerable	2007 (Current study)	Crown: DECC	Small numbers (up to 10 individuals) forage on exposed reef platforms between Bulgo and Stanwell Park (Current study).
**Gang-gang Cockatoo	Vulnerable	1991 (Whelan <i>et al.</i> 1991)	Private	Two birds were observed feeding on the fruit of Silvertop Ash <i>Eucalyptus sieberi</i> in 1991 (Whelan <i>et al.</i> 1991). Likely to be a rare visitor to the site.
Powerful Owl	Vulnerable	2007 (Current study)	Crown: DECC; private	Single birds responded to playback in Herbert and Camp Gullies in Mar 2007 (Current study). Previously recorded from Old Farm Rd, Helensburgh; 0.9 km west of the Hacking River adjacent to Otford Rd; and the picnic area at Kellys Falls (Atlas of NSW Wildlife records; D. Andrew, DEC, pers. comm.).
Sooty Owl	Vulnerable	2007 (Current study)	Crown: DECC; private	A single bird responded to playback adjacent to the mid reaches of Gardiners Creek and another bird was heard calling in a gully upslope of the Hacking River north of Otford Road in Mar 2007 (Current study). Previously recorded from 0.9 km west of the Hacking River adjacent to Otford Rd; Cedar Gully; Garbage Tip Creek and the picnic area at Kellys Falls (Atlas of NSW Wildlife records; Jordan 1989 cited in Whelan <i>et al.</i> 1991; Andrew 2001).
Koala	Vulnerable	1997 (Atlas of	Crown: RTA;	Status uncertain. The only

Species	Threat Category*	Last Recorded	Tenure	Comments
		NSW Wildlife record)	private	documented record was of two individuals along Otford Rd (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower or fruit. For example in Mar 2007 individuals were observed feeding in flowering Red Bloodwood <i>Corymbia gummifera</i> on ridgetops in a number of localities (Current study). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roosts: RailCorp, Peabody Colliery	Recorded roosting in a water aqueduct and disused railway tunnels in the site. For example 150 ⁺ in a water aqueduct at the Peabody Colliery and 8 ⁺ in an old railway tunnel north of Stuarts Gully (Current study). It is likely to use other disused railway tunnels and old mineshafts in the site. It is not known if any maternity roosts occur in the site.
Little Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: RailCorp	A small colony of 20 ⁺ individuals was located roosting in the disused Otford-Stanwell Park railway tunnel in Mar 2007 (Current study). This finding represents the most southerly record for this species (B. Law, DPI (Forests), pers comm.). It is not known whether this bat is a seasonal visitor to the site.
Southern Myotis	Vulnerable	2007 (Current study)	Foraging habitat along major watercourses; roosts: RailCorp, Peabody Colliery	Recorded roosting in a water aqueduct and disused railway tunnels in the site. For example 30 ⁺ in a water aqueduct at the Peabody Colliery and 20 ⁺ in the disused Otford-Stanwell Park railway tunnel in Mar 2007 (Current study). It is likely to use other disused railway tunnels and old mineshafts in the site. This bat may potentially breed in the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Cave-dwelling bat roosts located in two railway tunnels and one water supply tunnel; shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Habitat loss due to land development; tenuous continuous habitat link between Royal NP and the Illawarra Escarpment; weed infestation; disturbance to bats roosting in disused tunnels, including the erection of incorrect gating resulting in roost abandonment (refer to Gratton 2006, Thomson 2002); impacts of Rusa Deer on fragile communities, such as littoral rainforest; water quality of the Hacking River; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Predation by feral predators (such as the Brown Rat, Fox, Feral Dog and Feral Cat); impacts of fire; habitat degradation from horse riding and trail bikes; entanglement in discarded fishing tackle; rubbish dumping.



Most wet sclerophyll forest in the site is regenerating from past forest harvesting activities. M. Schulz/DECC



A large section of the site lies within the Peabody (formerly Metropolitan) Colliery. M. Schulz/DECC



Established coastal link through the site from Royal NP to the Illawarra. M. Schulz/DECC

Land Management:

The tenure of this site is complex. There are a multitude of land owners and managers found within and adjoining the site, including at least three government agencies managing sections of the land, a major coal mine (Peabody Colliery) and various private land owners. Any work within this area will require a cooperative approach to managing the site for fauna, in conjunction with adjacent DECC Estate (Garrawarra SCArea and Royal NP).

References and Further Reading:

Chafer *et al.* (1999), DEC (2003), DECC (2007a, b), Gration (2006), Keith (2004), NSW National Parks and Wildlife Service (1985, 2001c, 2002b), Quality Environmental Management (1994), Robinson (1977), Thomson (2002), Whelan *et al.* (1991).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – NSW National Parks and Wildlife Service (2003); +4 – DEC (2007a); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – Whelan *et al.* (1991); *2 – NSW National Parks and Wildlife Service (1985).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Stuttering Frog <i>Mixophyes balbus</i>	+3	E1	
Haswell's Froglet <i>Paracrinia haswelli</i>	*2	P	RS
Green Tree Frog <i>Litoria caerulea</i>	*2	P	RS
Blue Mountains Tree Frog <i>Litoria citropa</i>	*2	P	
Kuferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Freycinet's Frog <i>Litoria freycineti</i>	*2	P	RS
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Sheoak Skink <i>Cyclodomorphus michaeli</i>	*1	P	RS
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+1	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+1	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+1	P	RS
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	*1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+1	P	
Pacific Baza <i>Aviceda subcristata</i>	+1	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	*	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+1	P	RS
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Kelp Gull <i>Larus dominicanus</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-headed Pigeon <i>Columba leucomela</i>	+1	P	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+1	P	RS
Emerald Dove <i>Chalcophaps indica</i>	+1	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+1	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	*1	V	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	*1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Sooty Owl <i>Tyto tenebricosa</i>	+1	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	*1	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Pilotbird <i>Pycnoptilus floccosus</i>	*1	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
Yellow-throated Scrubwren <i>Sericornis citreogularis</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Large-billed Scrubwren <i>Sericornis magnirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	

Species	Status	Legal Status	Regional Status
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Logrunner <i>Orthonyx temminckii</i>	+1	P	RS
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+1	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	*1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	*1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+1	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	*1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Green Catbird <i>Ailuroedus crassirostris</i>	+1	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	*1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+1	P	RS
Common Starling <i>Sturnus vulgaris</i>	*1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Dusky Antechinus <i>Antechinus swainsonii</i>	*1	P	Unconfirmed
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Mountain Brushtail Possum <i>Trichosurus caninus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	

Species	Status	Legal Status	Regional Status
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Greater Glider <i>Petauroides volans</i>	*1	P	RS
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Horseshoe-bat <i>Rhinolophus megaphyllus</i>	+1	P	RS
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	*1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Little Bentwing-bat <i>Miniopterus australis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+1	P	RS
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Bush Rat <i>Rattus fuscipes</i>	+1	P	
Brown Rat <i>Rattus norvegicus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	*1	U	
Feral Pig <i>Sus scrofa</i>	*1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 19: WORONORA SPECIAL AREA

Location:

This site comprises the Woronora Special Area located north of Darkes Forest, east of Holsworthy Military Reserve and Dharawal SCArea, south of Heathcote NP and Holsworthy Military Reserve and west of the Southern Freeway (refer to Map ii)

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Campbelltown, Sutherland, Wollondilly and Wollongong

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	25	<1
Commonwealth Land	0	0
Remaining Public Land	1464	100
Other	10	0
Total	7499	100

Environmental Setting:



Lake Woronora upstream from the dam wall
M. Schulz/DECC



Heathland and upland swamps are scattered throughout the upper catchments of the site.
L. Magarey/DECC



Sandstone woodlands are widespread within the site. M. Schulz/DECC

This large site is located within one of Sydney's water supply catchments in the headwaters of the Woronora River. It is located within a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). The site is located on the Woronora Plateau, an area dominated by Hawkesbury Sandstone, with deposits of swamp alluvium accumulated in low-relief headwater valleys along the eastern edge of the plateau. Vegetation is dominated by upland swamps, heath and fringing heath woodland, exposed sandstone woodland and eastern gully forest (DEC 2003). The area is protected as a Sydney Catchment Authority Special Area with little public access. However, the ecosystem integrity of the upland swamps and headwaters streams are being impacted by subsistence, stream bed cracking and runoff; all associated with longwall mining operations. These impacts may result in the loss of a number of threatened and regionally significant species that require high quality upland swamps and associated minor tributaries for breeding, such as the Giant Burrowing Frog, Red-crowned Toadlet, Freycinet's Frog and Littlejohn's Tree Frog (DECC 2007b). Much of the area was extensively and intensively burnt by wildfire in 2001. The site supports two priority fauna habitats: heathland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: Supports a large diversity of fauna, many of which are limited in distribution within the CMA, including a number of species associated with upland swamps and heathlands, such as the threatened Littlejohn’s Tree Frog, Rosenberg’s Goanna and the Eastern Pygmy-possum.



The Giant Burrowing Frog is likely to be severely impacted by the effects of longwall mining in the site. L. Magarey/DECC



Other frogs such as Littlejohn’s Tree Frog are also likely to be impacted by longwall mining operations. D. Hunter/DECC



This site is one of the few localities within the CMA that supports populations of the Common Wombat. M. Schulz

Priority Fauna Species Review:

There have been 162 vertebrate fauna species (excluding fish and unconfirmed species) documented within this area in the last 10 years: 82 birds, 33 mammals, 29 reptiles and 18 frogs. Of these one species is considered endangered and 11 species as vulnerable (excluding unconfirmed species; discussed below). A further 34 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2002 (Atlas record)	Crown: SCA	Scattered records in areas of deep sandy soil in upland swamps, heath and fringing heath woodlands and exposed sandstone woodlands, such as the headwaters of Waratah Rivulet (Atlas of NSW Wildlife records). Breeding habitat, such as in Flat Rock Swamp likely to be impacted by subsidence and associated altered hydrological impacts resulting from longwall mining operations (K. Madden, DECC, pers. comm.).
**Stuttering Frog	Endangered	Early 1900s (Australian Museum record)	Uncertain	Precise locality unknown as the Australian Museum specimen was registered as ‘Darkes Forest’. May possibly have occurred in headwater streams within the site adjacent to Darkes Forest.
Red-crowned Toadlet	Vulnerable	2007 (Atlas record)	Crown: SCA	Scattered records in minor drainage lines and depressions in headwater streams, such as Honeysuckle Creek and Waratah Rivulet, as well as upslope Lake Woronora (Atlas of NSW Wildlife records). Impacts associated with longwall mining as for the Giant Burrowing Frog.
**Green and Golden Bell Frog	Endangered	1980s (Australian Museum record)	Uncertain	No recent records from the site or adjacent areas and considered to be locally extinct in the area (DEC 2005b).
Littlejohn’s Tree Frog	Vulnerable	2007 (Atlas record)	Crown: SCA	Poorly known in the site, with the only documented record from a headwater stream of the

Species	Threat Category*	Last Recorded	Tenure	Comments
				Woronora River (Atlas of NSW Wildlife record). Likely to occur in other headwater streams within the site. Impacts associated with longwall mining as for the Giant Burrowing Frog.
Rosenberg's Goanna	Vulnerable	1998 (Atlas record)	Crown: SCA	Poorly known in the site. The only documented record is from upslope of Lake Woronora (Atlas of NSW Wildlife record). Likely to occur elsewhere in the site.
Broad-headed Snake	Endangered	2002 (Atlas record)	Crown: SCA	Recorded upslope of Waratah Rivulet in May 2002 (Atlas of NSW Wildlife record). Likely to occur elsewhere within the site in exposed sandstone woodlands with rock outcrops and hollow-bearing trees.
Powerful Owl	Vulnerable	2000 (Atlas record)	Crown: SCA	Scattered records from adjacent to the lower reaches of Lake Woronora (Atlas of NSW Wildlife records).
Koala	Vulnerable	2005 (Atlas record)	Crown: SCA	Scattered records mainly from adjacent to the lower reaches of Lake Woronora, including Honeysuckle Creek (Atlas of NSW Wildlife records).
Eastern Pygmy-possum	Vulnerable	2005 (Atlas record)	Crown: SCA	Scattered records in upland swamps and exposed sandstone woodlands within the site (Atlas of NSW Wildlife records). Likely to be more common than the few records indicate.
Grey-headed Flying-fox	Vulnerable	2005 (Atlas record)	Crown: SCA	Forages widely across the site in a variety of habitats when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	1999 (Atlas record)	Crown: SCA	The only record is from the ridge between the Woronora River and Waratah Rivulet (Atlas of NSW Wildlife record). Status uncertain.
Eastern Bentwing-bat	Vulnerable	2000 (Atlas record)	Crown: SCA	Scattered records adjacent to the upper reaches of the Waratah Rivulet (Atlas of NSW Wildlife records). Likely to be more common than the few records indicate. No known roosts within the site.
Southern Myotis	Vulnerable	1999 (Atlas record)	Crown: SCA	A single record from the headwaters of the Woronora River (Atlas of NSW Wildlife record). Likely to be more widespread along larger watercourses within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Crown: SCA	Unconfirmed records by Anabat from headwaters of the Woronora River (Atlas of NSW Wildlife record). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattleed Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the

Species	Threat Category*	Last Recorded	Tenure	Comments
				absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Alteration to habitat, particularly upland swamps and associated headwater streams, following subsidence and stream bed cracking due to longwall mining; water quality associated with runoff from longwall mining.

Moderate: Impacts of high intensity fire; habitat loss in the adjoining Holsworthy Military Reserve; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); the illegal collection of reptiles, particularly the Broad-headed Snake; competition for hollows by feral Honeybees *Apis mellifera*.



The main impacts on faunal values in the site are associated with longwall mining, such as streambed cracking. DECC



Regenerating vegetation which was intensively and extensively burnt in the 2001 wildfire. M. Schulz/DECC



Public access is highly restricted in the site, resulting in little direct human disturbance to the fauna. M. Schulz/DECC

Land Management:

This site comprises the Woronora Special Area managed by the Sydney Catchment Authority.

References and Further Reading:

DEC (2003, 2004a, 2005b), DECC (2007a, b, c), Keith (2004), Keith *et al.* (2006), NSW National Parks and Wildlife Service (2000a, 2001c, d, 2003a), Pennay *et al.* (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 – Atlas of NSW Wildlife; +2 – DECC (2007c); +3 – Current survey (species not recorded in Atlas); * - only recorded prior to 1997 (Atlas of NSW Wildlife).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+1	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Stuttering Frog <i>Mixophyes balbus</i>	*	E1	
Haswell's Froglet <i>Paracrinia haswelli</i>	+2	P	RS
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	*	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	*	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	*	E1	
Green Tree Frog <i>Litoria caerulea</i>	*	P	RS
Blue Mountains Tree Frog <i>Litoria citropa</i>	+1	P	
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Freycinet's Frog <i>Litoria freycineti</i>	+1	P	RS
Jervis Bay Tree Frog <i>Litoria jervisiensis</i>	+1	P	
Broad-palmed Frog <i>Litoria latopalmata</i>	+1	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Littlejohn's Tree Frog <i>Litoria littlejohni</i>	+1	V	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+1	P	
Reptiles:			
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+1	P	
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus millii</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+1	P	RS
Eastern Brown Tree Snake <i>Boiga irregularis</i>	+1	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+1	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Mustard-bellied Snake <i>Drysdalia rhodogaster</i>	+2	P	RS
Red-naped Snake <i>Furina diadema</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Broad-headed Snake <i>Hoplocephalus bungaroides</i>	+1	E1	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	*	P	RS
Birds:			
White-necked Heron <i>Ardea pacifica</i>	+2	P	
Whistling Kite <i>Haliastur sphenurus</i>	*	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+3	P	
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+1	P	
Brown Falcon <i>Falco berigora</i>	+2	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+3	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+1	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+1	P	RS
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
Crescent Honeyeater <i>Phylidonyris pyrrhoptera</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Robin <i>Petroica boodang</i>	+1	P	RS
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+1	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+3	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	+1	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Rufous Songlark <i>Cincloramphus mathewsi</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+1	P	RS
Koala <i>Phascolarctos cinereus</i>	+1	V	
Common Wombat <i>Vombatus ursinus</i>	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+1	V	
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+1	P	RS
Common Wallaroo <i>Macropus robustus</i>	+1	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Horseshoe-bat <i>Rhinolophus megaphyllus</i>	+1	P	RS
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+1	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+1	V	Unconfirmed
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+2	U	
Swamp Rat <i>Rattus lutreolus</i>	+1	P	RS
Bush Rat <i>Rattus fuscipes</i>	+1	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 20: GARAWARRA STATE CONSERVATION AREA

Location:

This site comprises the northern two sections of Garawarra SCA: one is situated between the Southern Freeway, the Illawarra Railway Line and Helensburgh and the other is bounded by Royal NP to the north and west, by the Illawarra Railway Line to the south and by the Hacking River to the east (refer to Map ii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Hacking River

Local Government Area:

Sutherland and Wollongong

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	874	89
Crown Land	1	<1
Commonwealth Land	0	0
Remaining Public Land	0	0
Other (including Public Land)	103	11
Total	978	100

Environmental Setting:



Forested rolling hills on the eastern edge of the western Garawarra SCA block. M. Schulz/DECC



Rainforest along Camp Gully. M. Schulz/DECC



Heathy woodland on the western edge of the site. M. Schulz/DECC

This site is located on the western side of the Hacking River and encompasses sections of Cawleys and Wilsons Creeks and Camp and Stuart Gullies. It is located within a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). It also forms an important section of the link between Royal NP and the Illawarra Escarpment (refer to Upper Hacking site) and an important habitat link between parts of Royal NP and Heathcote NP (NSW National Parks and Wildlife Service 1985, 2000b). The site is located on the edge of the Woronora Plateau and is dominated by Hawkesbury Sandstone characterised by steep valleys and ridges, rocky outcrops and streams which are punctuated by waterfalls and pools. The eastern section slopes downwards gradually giving way to Narrabeen Group shales in the deeply dissected Hacking River valley and is characterised by broad gently sloping ridges and small eastward flowing drainage lines. The Hacking River forms the eastern edge of the site and is characterised in this section of the river by being relatively narrow, with deep pools running through rainforest gullies. Vegetation is diverse ranging from exposed sandstone woodlands, sandstone gully forest, heath woodland with areas of tall moist eucalypt forests on lower slopes and patches of subtropical and warm temperate rainforest along gully lines in the Hacking River valley (NSW National Parks and Wildlife Service 2000b). These areas of rainforest represent the northernmost extent of the once extensive rainforests of the Illawarra region (NSW National Parks and Wildlife Service 2000b). The majority of the area is protected as conservation reserve with comparatively little visitation compared to Royal NP which surrounds much of this site. A large part of the area was extensively and intensively burnt by wildfire in 2001 (DEC 2006d). Water quality in the creek systems are relatively low due to runoff from Peabody Colliery, Helensburgh Waste Depot and stormwater runoff from Helensburgh and the Southern Freeway. The fauna of the site is comparatively poorly known compared to adjoining areas,

such as Royal NP, Heathcote NP and Woronora Special Area. The site supports two priority fauna habitats: rainforest and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Supports a moderate diversity of fauna, many of which are limited in distribution within the CMA, including a number of species associated with heathlands, such as the threatened Rosenberg’s Goanna and Red-crowned Toadlet and species associated with subtropical rainforest, such as the regionally significant Logrunner, Green Catbird and Yellow-throated Scrubwren.



The Bassian Thrush occurs in rainforest and wet sclerophyll forest in the Hacking River valley. M. Schulz



Often mistaken for a snake, the Southern Scaly-foot occurs within the site. M. Schulz/DECC



The most widespread and abundant frog in Garawarra SCA is the Common Eastern Froglet. M. Schulz

Priority Fauna Species Review:

There have been 138 vertebrate fauna species (excluding fish species) documented within this area in the last 10 years: 93 birds, 21 reptiles, 17 mammals and seven frogs. Of these seven species are considered vulnerable (discussed below). A further 32 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2007 (Current study)	Crown: Garawarra SCArea	Status uncertain. Scattered records in minor drainage lines and depressions in a variety of vegetation associations (Current study; Atlas of NSW Wildlife records).
Rosenberg’s Goanna	Vulnerable	2007 (Current study)	Crown: Garawarra SCArea	Status uncertain. One seen in Smooth-barked Apple <i>Angophora costata</i> ridgetop woodland with a heathy understorey on a track just east of the Southern Freeway in Sept 2007 (Current study). Several records of roadkills on the Southern Freeway immediately on the western boundary of the site (K. Madden and M. Schulz, DECC, unpublished records).

Species	Threat Category*	Last Recorded	Tenure	Comments
Powerful Owl (UNCONFIRMED)	Vulnerable	Inferred due to proximity of records in 2007	Uncertain	Likely to range into the eastern section of the site as it was recorded just west of the area in Camp Gully (refer to the Upper Hacking site; Current study).
Sooty Owl (UNCONFIRMED)	Vulnerable	1998 (Atlas record)	Crown: Garawarra SCArea	Recorded in moist forest along the Hacking River valley in Apr 1998 (Atlas of NSW Wildlife records). Status uncertain, particularly after the 2001 wildfire.
Eastern Pygmy-possum	Vulnerable	2002 (Tulloch 2003)	Crown: Garawarra SCArea	Status uncertain but likely to be widespread, particularly in the western section of the site.
Grey-headed Flying-fox	Vulnerable	2007 (K. Madden and M. Schulz, DECC, unpublished records)	Crown: Garawarra SCA	Forages widely across the site in a variety of habitats when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Large-eared Pied Bat	Vulnerable	1997 (Andrew 2001)	Crown: Garawarra SCArea	Recorded along the Hacking River (Andrew 2001).
Eastern Bentwing-bat (UNCONFIRMED)	Vulnerable	Inferred due to proximity of roosts in 2007	Uncertain	Recorded roosting <1km away in an aqueduct in the Peabody Colliery and an old railway tunnel north of Stuarts Gully (refer to Upper Hacking site; Current study). Therefore, likely to forage over the current site.
Southern Myotis	Vulnerable	1997 (Andrew 2001)	Crown: Garawarra SCArea	Recorded along the Hacking River (Andrew 2001).

* As listed under TSC Act 1995.

Additional Faunal Values: Nil (although several bat roosts located within 1km of the western boundary of the eastern section of the site).

Identified Threats to Fauna Values:

High: Impacts of high intensity fire; water quality; weed infestation; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Predation by feral predators (such as the Fox and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; bush rock removal and the illegal collection of reptiles, particularly the Broad-headed Snake; impacts associated with easements within the area; competition for hollows by feral Honeybees *Apis mellifera*; rubbish dumping; activities of off-road vehicles, mountain bikes and horses, particularly in the western section of the site.



Impacts on gully vegetation associated with a recently slashed powerline easement. M. Schulz/DECC



Tracks within Garawarra SCA are frequently used by off-road vehicles, mountain bikes and horses. M. Schulz/DECC



The fauna of Garawarra SCA is less well known than adjacent areas, particularly the bat species. M. Schulz

Land Management:

This site comprises the two northern sections of Garawarra SCArea managed by DECC, with a section of land centred on the dam on Wilsons Creek managed by Peabody Colliery and bushland adjacent to the Southern Freeway managed by the RTA.

References and Further Reading:

Andrew (2001), Anyon-Smith (2006), DECC (2007a, b), Keith (2004), NSW National Parks and Wildlife Service (1985, 2000b, 2001c, e, 2003a), Parnaby (2001), Tulloch (2003).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Anyon-Smith (2006); +5 – Andrew (2001); +6 – Parnaby (2001); +7- M. Schulz, DECC, unpublished records; +8 – Tulloch (2003); +9 – K. Oakes, DECC, pers. comm.; * - only recorded prior to 1997 (Atlas of NSW Wildlife).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Blue Mountains Tree Frog <i>Litoria citropa</i>	+2	P	
Kuferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Reptiles:			
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+9	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+7	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Weasel Shadenskink <i>Saproscincus mustelinus</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+7	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	*	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Mainland Tiger Snake <i>Notechis scutatus</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+4	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Pacific Baza <i>Aviceda subcristata</i>	+4	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+4	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+4	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+2	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Painted Button-quail <i>Turnix varia</i>	+4	P	RS
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+4	P	RS
Brush Bronzewing <i>Phaps elegans</i>	+4	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+4	P	
Sooty Owl <i>Tyto tenebricosa</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+4	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+4	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+7	P	
Azure Kingfisher <i>Alcedo azurea</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+4	P	

Species	Status	Legal Status	Regional Status
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+2	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Pilotbird <i>Pycnoptilus floccosus</i>	+1	P	RS
Yellow-throated Scrubwren <i>Sericornis citreogularis</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+4	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+4	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+4	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Scarlet Robin <i>Petroica boodang</i>	+2	P	RS
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Logrunner <i>Orthonyx temminckii</i>	+7	P	RS
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+4	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	*	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+4	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+4	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Cicadabird <i>Coracina tenuirostris</i>	+4	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	+1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Green Catbird <i>Ailuroedus crassirostris</i>	+7	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Beautiful Firetail <i>Stagonopleura bella</i>	+2	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+2	P	RS
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Mountain Brushtail Possum <i>Trichosurus caninus</i>	+5	P	RS
Eastern Pygmy-possum <i>Cercartetus nanus</i>	+8	V	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Greater Glider <i>Petauroides volans</i>	+2	P	RS
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+7	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+7	P	
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	+5	V	
Little Forest Bat <i>Vespadelus vulturinus</i>	+5	P	
Southern Myotis <i>Myotis macropus</i>	+5	V	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+5	P	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	

Site 21: PORT HACKING

Location:

Intertidal flats, saline wetlands and fringing shoreline along the southern section of Port Hacking from Deeban Spit to the Hacking River mouth, including Grays Point and Swallow Rock Reserves (refer to Map ii). This site does not include fringing shoreline that is incorporated within Royal National Park.

Relative Area Size in CMA:

Medium

Sub-catchment:

Hacking River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	7	2
Crown Land	69	25
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	206	73
Total	282	100

Environmental Setting:



White Mangroves, Grays Point. M. Schulz/DECC



Fringing woodland upslope of Port Hacking. M. Schulz/DECC



Port Hacking sand flats at low tide. M. Schulz/DECC

Port Hacking is the estuarine downstream reach of the Hacking River, which flows into Bate Bay. It is a drowned river valley with a total surface area of 11km². The port because of its sheltered nature is protected from high energy waves allowing for the presence of intertidal sandflats, mangroves and saltmarsh areas. The estuary is characterised by two distinct and mobile sand bodies: a fixed quantity of marine sand located near the entrance and a riverine delta at the upstream end (NSW Department of Natural Resources 2007). Hawkesbury Sandstone platforms and cliffs are present but not as developed as elsewhere along the Sydney coast. Land use around the estuarine section of the Hacking catchment is mainly residential on the northern shore, with the bushland of Royal National Park on the southern shore. Since there is little industrial and no agricultural inputs the water quality of the area is categorised as extremely good (NSW Department of Natural Resources 2007). The site supports two priority fauna habitats: rainforest and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports foraging habitat for a variety of shorebirds and other waterbirds; including the threatened Pied Oystercatcher and regionally significant species such as the Bar-tailed Godwit, Eastern Curlew and Whimbrel.



The Bar-tailed Godwit is one of the most frequently occurring migratory shorebirds in the site. M. Schulz



Small numbers of the threatened Pied Oystercatcher regularly occur. M. Schulz



A variety of waterbirds occur in small numbers, such as the Great Egret. M. Schulz

Priority Fauna Species Review:

There have been 104 vertebrate fauna species (excluding fish and marine species) documented within this area in the last 10 years: 93 birds, five reptiles, five mammals and one frog. Of these one is considered endangered (excluding vagrants), five as vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further 16 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2005 (B. Graham, Sutherland Shire Council, pers. comm.)	Sutherland Shire	This frog was recorded in the Grays Point Reserve in 2005. It is likely to occur in damp situations elsewhere along fringing shorelines, such as west of Swallow Rock Reserve.
Osprey	Vulnerable	2007 (Current study)	Various	Rare visitor. Occasional individuals observed (Anyon-Smith 2006). Prior to 1900 a few pairs frequented the inlets of this site (Hoskin <i>et al.</i> 1991).
Beach Stone-curlew (VAGRANT)	Endangered	1998 (Anyon-Smith 2006)	Crown	Vagrant. Single bird recorded on sand flats off Bonnie Vale and Maianbar in winter 1998 (Anyon-Smith 2006; Atlas of NSW Wildlife).
Pied Oystercatcher	Vulnerable	2007 (Current study)	Crown	Regular non-breeding bird with up to six individuals recorded in Jan and Feb 2007 (Current Study). No breeding records although suitable habitat is present on Deeban Spit.
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown	Status uncertain. The lack of high tide roosts in Port Hacking suggests that some individuals from this endangered community fly south at low tide to forage on exposed intertidal flats off Maianbar in Port Hacking.
Little Tern	Endangered	(Anyon-Smith 2006)	Crown	Occasionally seen in Port Hacking (Anyon-Smith 2006). No nesting records.
Powerful Owl	Vulnerable	1992 (Atlas record)	Widespread along shoreline	Two individuals recorded in Black Gully, Maianbar in Mar

Species	Threat Category*	Last Recorded	Tenure	Comments
				1992 (Atlas of NSW Wildlife). A pair is also known from the Cabbage Tree Basin area of the adjoining Royal NP (R. Jackson, pers. comm.). Therefore, it is likely that additional individuals occur in forest fringing Port Hacking.
**Sooty Owl	Vulnerable	1996 (Kavanagh & Jackson 1997)	Widespread on north side	A radio-tagged individual that roosted in the Engadine-Woronora Heights area and Kangaroo Creek gully system of Royal NP, also roosted and foraged in the Gynea Bay area on the north side of Port Hacking (Jackson & Kavanagh 1997; Kavanagh & Jackson 1997). This bird ranged as far east as the Lilli Pilli area.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread along shoreline	Occasionally forage in flowering gums and fruiting figs along the shoreline of Port Hacking, such as in Grays Point Reserve (Sutherland Shire Council 2001). There are no camps known from this site (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points NSW Scientific Committee (1998).

Additional Faunal Values: Tidal shoreline regularly used by small numbers of migratory shorebirds. Additionally there is an endangered population of a beetle *Menippus fugitivus* (Chrysomelidae) occurring in a stand of Native Celtis *Celtis paniculata* that is present in remnant Sutherland Shire Littoral Rainforest (an Endangered Ecological Community) in Grays Point Reserve (NSW National Parks and Wildlife Service 2007). This locality supports the only mainland New South Wales population, the other being on Lord Howe Island.

Identified Threats to Fauna Values:

High: Disturbance due to jet skis, boats and high public visitation; disturbance by uncontrolled domestic dogs; water quality; Rusa Deer habitat alteration; marine invertebrate harvesting; sand dredging; potential bird strike from overhead powerlines crossing Port Hacking.

Moderate: Weed infestation; predation by feral predators (such as the Fox); impacts of fire; entanglement in discarded fishing tackle.



Dogs regularly chase shorebirds on the exposed sand flats of Port Hacking. M. Schulz



Deeban Spit, little used by roosting birds due to regular disturbance. M. Schulz/DECC



Powerlines crossing Port Hacking require bird strike mitigation devices such as these. M. Schulz

Land Management:

The site is predominantly Crown land with several fringing reserves on the north side managed by the Sutherland Shire Council.

References and Further Reading:

Anyon-Smith (2006), DEC (2005b), DECC (2007b), Geering *et al.* (2007), Hoskin *et al.* (1991), Jackson & Kavanagh (1997), Kavanagh & Jackson (1997), Keith (2004), NSW Department of Natural Resources (2007), NSW National Parks and Wildlife Service (2007), NSW Scientific Committee (1998), Straw (2005), Sutherland Shire (2000), Sutherland Shire Council (2001).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Only recorded in Anyon-Smith (2006); +4 – Sutherland Shire Council (2001); +5 – B. Graham, Sutherland Shire Council, pers. comm.; +6 – Records from various observers posted on the Birding-aus website; +7 – R. Jackson, pers. comm.; * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Kavanagh & Jackson 1997).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Red-crowned Toadlet <i>Pseudophryne australis</i>	+5	V	
Reptiles:			
Broad-tailed Gecko <i>Phyllurus platurus</i>	+4	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+4	P	
Diamond Python <i>Morelia spilota spilota</i>	+4	P	RS
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+2	P	
Great Egret <i>Ardea alba</i>	+3	P	RS
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Osprey <i>Pandion haliaetus</i>	+1	V	
Whistling Kite <i>Haliastur sphenurus</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Whimbrel <i>Numenius phaeopus</i>	+3	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+1	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+3	P	RS
Beach Stone-curlew <i>Esacus neglectus</i>	+2	E1	
Pied Oystercatcher <i>Haematopus longirostris</i>	+1	V	
Red-capped Plover <i>Charadrius ruficapillus</i>	+2	P	RS
Double-banded Plover <i>Charadrius bicinctus</i>	+1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Kelp Gull <i>Larus dominicanus</i>	+3	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	+3	P	
Common Tern <i>Sterna hirundo</i>	+3	P	RS
Little Tern <i>Sterna albifrons</i>	+3	E1	
White-headed Pigeon <i>Columba leucomela</i>	+4	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+7	V	
Sooty Owl <i>Tyto tenebricosa</i>	*1	V	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Fork-tailed Swift <i>Apus pacificus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Mangrove Gerygone <i>Gerygone laevigaster</i>	+3	P	RS

Species	Status	Legal Status	Regional Status
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Fox <i>Vulpes vulpes</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 22: WESTERN SYDNEY REGIONALPARK

Location:

Remnant bushland on Fairfield Farm and in the southern section of Western Sydney Regional Park situated within the CMA (refer to Map ii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Fairfield

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	68	49
Crown Land	0	0
Commonwealth Land	0	0
Other Public Land	1	1
Other (including Public Land)	70	50
Total	139	100

Environmental Setting:



Looking from the site east toward Sydney across cleared sections of Fairfield Farm. M. Schulz/DECC



Grey Box- Spotted Gum ridge woodland with dense African Olive understorey. M. Schulz/DECC



Tall Spotted Gum woodland on lower slopes, Fairfield Farm. M. Schulz/DECC

This site is situated on the transition between rural and urban landscapes within the upper Georges River catchment south of Prospect Reservoir on the western edge of the CMA. It is bordered in part to the west by the M7 Motorway, to the south by the suburb of Cecil Hills and to the east by the newly developed suburb of Abbotsbury. To the north the site is bordered by extensive areas of the Western Sydney RP that were formerly grazing lands with large sections now regenerating or replanted. In years to come as the regenerating vegetation ages, becomes more complex and covers a greater area the faunal values of this site is likely to increase and the site could be extended northwards to incorporate the rest of Western Sydney RP. The site is dominated by a central ridge with steep-sided slopes on Bringelly Shale, part of the Wianamatta Group shales, in places associated with Minchinbury Sandstone outcropping. The fringes of the area comprise gentle crests and ridges on Wianamatta Group shales with a number of dams and artificial wetlands located on small drainage channels. The remnant vegetation comprises Cumberland Plain woodland, dominated by Grey Box *Eucalyptus moluccana* and Spotted Gum *Corymbia maculata*. All communities within the Cumberland Plain woodland comprise endangered ecosystems under the TSC Act (1995): Shale Plains Woodland, River-flat Eucalypt Forest on Coastal Floodplains, Western Sydney Dry Rainforest, Moist Shale Woodland and Shale Hills Woodland (Leary 2006). Much of the remnant woodland is degraded due to African Olive *Olea europaea* subspecies *cuspidata* infestation and in the Fairfield Farm section due to grazing by livestock and associated erosion. This site is marginally linked by discontinuous vegetation to Prospect Reservoir NR, with a number of habitat discontinuities due to current land use practices and roads and other easements. The site primarily comprises two priority fauna habitats: dry rainforest and grassy woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Highly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Increase
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Fauna present is characteristic of grassy woodlands, including threatened species that are uncommon within the CMA such as the Swift Parrot and the East-coast Freetail-bat.



A rare sight in much of the CMA: a Lace Monitor sunning itself in late afternoon sun on the side of a dead tree. M. Schulz/DECC



The poorly known East-coast Freetail-bat, a threatened species, has been recorded in this site. N. Williams



The Robust Ctenopus is a common skink in the grassy woodland where African Olives are not present. M. Schulz

Priority Fauna Species Review:

There have been 166 vertebrate fauna species (excluding fish, unconfirmed species and escapees) documented within this area in the last 10 years: 120 birds, 23 mammals, 14 reptiles and nine frogs. Of these one species is considered endangered and four species as vulnerable (excluding unconfirmed species; discussed below). A further 33 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Swift Parrot	Endangered	2007 (Current survey)	Crown: DECC; Fairfield City Council	The only documented record is of two individuals feeding in a flowering Grey Box on 4 Sept 2007 (Current survey). Similar to nearby Prospect NR, this species could potentially feed on blossoms in autumn and winter flowering trees throughout the site. Regular monitoring during this period over a number of years is required to determine the importance of this site to the species.
Turquoise Parrot	Vulnerable	2003 (Leary 2006)	DECC	Status uncertain. Recorded by Leary (2006).
Grey-headed Flying-fox	Vulnerable	2004 (Atlas record)	Widespread	Forages in the site when suitable trees and shrubs are in flower or fruit (Leary 2006). No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	1999 (Atlas record)	Widespread	Detected using Anabat in the Fairfield Farm section of the site in Oct 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.

Species	Threat Category*	Last Recorded	Tenure	Comments
Eastern Bentwing-bat	Vulnerable	1999 (Atlas record)	Widespread foraging habitat; roost (currently unknown)	Detected using Anabat in the Fairfield Farm section of the site in Oct 1999 (Atlas of NSW Wildlife record). Likely to roost in tunnels along the Water Supply Channel to Prospect Reservoir, such as the Cecil Hills and Calmsley Tunnels or in bridges of the adjacent M7 Motorway (as found at the Hoxton Park site several kilometres to the south).
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Widespread	Unconfirmed records identified from ultrasonic calls recorded from the Fairfield Farm area in Oct 1999 (Atlas of NSW Wildlife record). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).
Greater Broad-nosed Bat (UNCONFIRMED)	Vulnerable	2003 (Leary 2006)	Western Sydney Regional Park	Status uncertain. Unconfirmed records identified from ultrasonic calls recorded from Western Sydney Regional Park to the northwest of the current site (Atlas of NSW Wildlife record).

* As listed under TSC Act 1995.

Additional Faunal Values: Nil for vertebrate species. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Leary 2006; Current study; Atlas of NSW Wildlife records).

Identified Threats to Fauna Values:

High: Habitat loss; weed infestation (particularly from the African Olive); trampling and grazing by livestock (in the Fairfield Farm section); tree dieback; loss of remaining hollow-bearing trees; impacts of Rabbit grazing.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); impacts of fire; disturbance by uncontrolled domestic dogs; predation by domestic cats; competition for hollows by feral Honeybees *Apis mellifera*; barbwire fence entanglement (for the Grey-headed Flying-fox); erosion; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.



Livestock have an impact on shrub and ground layer vegetation in the Fairfield Farm section of the site. M. Schulz/DECC



Hollow-bearing trees are scattered across the site. Note the numerous Lace Monitor scratches on the trunk. M. Schulz/DECC



Tree dieback is prevalent and could in the long-term have a major impact on the fauna values of the site. M. Schulz/DECC

Land Management:

This site comprises a section of Western Sydney Regional Park managed by DECC and Fairfield Farm managed by Fairfield City Council (leased from DECC).

References and Further Reading:

Australian Museum Business Services (1996a), DECC (2007b), Keith (2004), Leary (2006), NSW National Parks and Wildlife Service (2001d), Pennay *et al.* (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Leary (2006); * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	+1	P	RS
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+4	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+1	P	RS
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Tree-base Litter-skink <i>Carlia foliorum</i>	+2	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Birds:			
Stubble Quail <i>Coturnix pectoralis</i>	+4	P	RS
Brown Quail <i>Coturnix ypilophora</i>	+3	P	RS
King Quail <i>Coturnix chinensis</i>	+3	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	

Species	Status	Legal Status	Regional Status
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+2	P	
Cattle Egret <i>Ardea ibis</i>	+2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+4	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+4	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+4	P	
Royal Spoonbill <i>Platalea regia</i>	+4	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+4	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+4	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+2	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Brown Falcon <i>Falco berigora</i>	+1	P	
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+4	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+4	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Black-fronted Dotterel <i>Euseiornis melanops</i>	+4	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+4	P	
Rock Dove <i>Columba livia</i>	+4	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	

Species	Status	Legal Status	Regional Status
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+1	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Turquoise Parrot <i>Neophema pulchella</i>	+4	V	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Barn Owl <i>Tyto alba</i>	+4	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+4	P	
Weebill <i>Smicromis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+4	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+4	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+4	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+3	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+4	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+4	P	RS
House Sparrow <i>Passer domesticus</i>	+4	U	
Zebra Finch <i>Taeniopygia guttata</i>	+4	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+2	U	
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	+4	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Hirundo nigricans</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+4	P	
Little Grassbird <i>Megalurus gramineus</i>	+4	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+2	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Southern Freetail-bat <i>Mormopterus planiceps</i> (long penis form)	+4	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+2	P	
Southern Forest Bat <i>Vespadelus regulus</i>	+4	P	Unconfirmed
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+4	V	Unconfirmed
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	

Species	Status	Legal Status	Regional Status
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	
Feral Goat <i>Capra hircus</i>	+4	U	

High Ranking Fauna Sites

Thirteen sites of remnant bushland greater than 50ha in area within the CMA were identified as having a high fauna ranking. The majority of these sites were of medium or small size, with one site covering a large area (Menai). Four sites comprise land that is either totally or partially reserved as crown land for nature conservation managed by DECC. The remaining sites include predominantly Commonwealth land (Malabar Headland) or comprise land that comprise a variety of land tenures.



Map iii: Native Vegetation Remnants with High Fauna Significance

Site 23: BOTANY BAY NATIONAL PARK (KURNELL SECTION)

Location:

Botany Bay NP on the eastern end of Kurnell Peninsula incorporating the southern headland at the entrance of Botany Bay and extending south to Bate Bay (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	397	96
Crown Land	4	1
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	13	3
Total	414	100

Environmental Setting:



Heathland and freshwater wetlands, Botany Bay NP. M. Schulz/DECC



Sea cliffs, Botany Bay NP. M. Schulz/DECC



Woodland, northern section of Botany Bay NP. M. Schulz/DECC

The Botany Bay National Park (Kurnell section) incorporates remnant vegetation on the southern side of Botany Bay entrance south to Bate Bay. The vegetation comprises heathland, dry sclerophyll forest and wetlands associated either with Hawkesbury Sandstone or deposits of aeolian and alluvial sands. The shoreline primarily comprises clifflines with some intertidal reef platforms and small sandy beaches on the Botany Bay side. Cape Solander is an important locality for the annual census of Humpback Whales *Megaptera novaeangliae* migrating north along the coast during the months of June and July (Cape Solander Whale Migration Study; NSW National Parks and Wildlife Service 2006). This study has been conducted annually since 1998. The sea cliffs are also notable locations for spotting other cetaceans, notably the Southern Right Whale *Eubalaena australis* and a large variety of seabirds, including threatened species such as the Southern Giant-Petrel *Macronectes giganteus* and various albatross species. This site is only tenuously linked by continuous vegetation through private land to Towra Point NR (see Kurnell site). The site supports two priority fauna habitats: freshwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a heathland fauna that was formerly widespread, including some species that are uncommon in the CMA, such as the threatened Wallum Froglet, and regionally significant Lewin’s Rail, Southern Emu-wren and Tawny-crowned Honeyeater.



The coastal wetlands support populations of the Wallum Froglet, a rare frog in the CMA. M. Schulz



Potential roosts of the Eastern Bentwing-bat may occur in the sea cliffs around Blue Hole Gorge. M. Schulz/DECC



Cape Solander is a site used for censusing the annual northward migration of Humpback Whales. M. Schulz

Priority Fauna Species Review:

There have been 126 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 91 birds, 15 mammals, 13 reptiles, and seven frogs. Of these one is considered endangered and six as vulnerable (excluding vagrant species) and one endangered ecological fauna community occurs (discussed below). A further 18 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Wallum Froglet	Vulnerable	2007 (Current study)	Crown: DECC	Breeding populations present in coastal heath swamps, such as south of Tabbigai Gap and adjacent to the western boundary near the Caltex refinery.
Green and Golden Bell Frog	Endangered	1997 (Atlas record)	Crown: DECC	This site supports a component of the Kurnell key population of the species that is the second largest population in the CMA (DECC 2007). The only recent location is NE of Captain Cook Obelisk (Atlas of NSW Wildlife record). There was an earlier record of five individuals from the NW side of Solander Hill in Oct 1993 (Atlas of NSW Wildlife record).
Sooty Oystercatcher	Vulnerable	2007 (Current study)	Crown: DECC, DPI	Small numbers forage on exposed reef platforms, particularly west of Doughboy Head and around Sutherland and Inscription Points. Maximum number of 11 individuals recorded on the shore at Captain Cook’s Landing in May 1999 (Drake-Brockman 1999).
Pied Oystercatcher	Vulnerable	2001 (Atlas record)	Crown: DECC, DPI	Occasional visitor, primarily around Sutherland and Inscription Points (Atlas of NSW Wildlife records).
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown: DECC, DPI	Occasional small numbers of shorebirds, primarily the Bar-tailed Godwit, occasionally forage on exposed reef platforms between the Park boundary and Inscription Point (G. Ross, DECC, pers. comm.; Current study).
Powerful Owl	Vulnerable	1997 (Atlas record)	Crown: DECC	Occasionally recorded, with the only recent record in the Houston Lookout area (Atlas of NSW Wildlife record). Not known to nest in the site.
**Regent Honeyeater	Endangered	1974 (Atlas record)	Crown: DECC	No recent records. Small numbers at Captain’s Cook Landing Place in Aug 1973 (Morris 1989).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Crown: DECC	Large numbers from the seasonally occupied Kurnell camp forage on a variety of flowering plants in the area in the summer and autumn months, particularly targeting the Red Bloodwood <i>Corymbia gummifera</i> and Coast Banksia <i>Banksia integrifolia</i> .

Species	Threat Category*	Last Recorded	Tenure	Comments
Yellow-bellied Sheath-tail-bat (VAGRANT)	Vulnerable	2000 (Atlas record)	Crown (DECC)	One individual found at Commemoration Flat. Status in the Sydney area uncertain, commonly considered to be a vagrant (DECC 2007b; H. Parnaby, DECC, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Crown (DECC)	Three males were trapped in Blue Hole Gorge in Feb 2007. There are no known roosts and these individuals may have originated from colonies utilising disused gunnery emplacements north of Botany Bay entrance, such as at Henry Head. However, it is possible that the species may shelter in sea caves within the NP.

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: Tidal shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Lack of secure habitat connectivity to other bushland remnants; potentially adverse management activities on adjoining land; fire frequency and extent; habitat degradation by trail bikes and horses, particularly low heathland and freshwater wetlands; disturbance due to high public visitation in some parts of the park; weed infestation; damage as a result of an oil spill from the Caltex Oil Refinery loading facility at Kurnell; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; disturbance by uncontrolled domestic dogs, particularly on the Botany Bay foreshore; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); entanglement in discarded fishing tackle; impacts associated with easements within the site.



Fire is a major fauna management issue within the site. M. Schulz/DECC



Adjacent land uses may impact on fragile vegetation communities. M. Schulz/DECC



The narrow entrance of Botany Bay; a natural barrier for many fauna species. M. Schulz/DECC

Land Management:

The site lies predominantly within the Botany Bay NP (Kurnell Section) and the intertidal area is managed by DPI Fisheries including Inscription Point Intertidal Protected Area (NSW DPI Fisheries 2005a) and part of Boat Harbour Aquatic Reserve (NSW DPI Fisheries 2007c).

References and Further Reading:

DEC (2005b, 2006a, b), DECC (2007, 2007b), Drake-Brockman (1999), Keith (2004), Morris (1989), NSW DPI Fisheries (2005a, 2007c), NSW National Parks and Wildlife Service (2001a, b, c, 2002a, d, 2003, 2006).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 - G. Ross, DECC, pers. comm.; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris 1989).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Wallum Froglet <i>Crinia tinnula</i>	+1	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	*1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Lesueur's Frog <i>Litoria lesueuri</i>	*1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Reptiles:			
Eastern Snake-necked Turtle <i>Chelodina longicollis</i>	*1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	*1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Bind Snake <i>Ramphotyphlops nigrescens</i>	*1	P	
Yellow-faced Whipsnake <i>Demansia psammophis</i>	+1	P	
Marsh Snake <i>Hemiaspis signata</i>	+1	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Chestnut Teal <i>Anas castanea</i>	+2	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+2	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+2	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
White-necked Heron <i>Ardea pacifica</i>	+3	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Square-tailed Kite <i>Lophoictinia isura</i>	*1	V	
Whistling Kite <i>Haliastur sphenurus</i>	+2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	*1	P	
Brown Falcon <i>Falco berigora</i>	*1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Lewin's Rail <i>Rallus pectoralis</i>	+1	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	+4	P	RS
Whimbrel <i>Numenius phaeopus</i>	*1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	*2	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+2	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	*1	P	RS
Red-necked Stint <i>Calidris ruficollis</i>	*1	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	+2	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Double-banded Plover <i>Charadrius bicinctus</i>	*1	P	RS
Lesser Sand-plover <i>Charadrius mongolus</i>	*1	V	
Black-fronted Dotterel <i>Elseyornis melanops</i>	*2	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+3	P	
Kelp Gull <i>Larus dominicanus</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Gull-billed Tern <i>Sterna nilotica</i>	*1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	*1	P	
Common Tern <i>Sterna hirundo</i>	*2	P	RS
Rock Dove <i>Columba livia</i>	+2	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	*2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basal</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	*1	P	RS
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Fork-tailed Swift <i>Apus pacificus</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	*2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	*2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	*2	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	*1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	*1	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*1	E1	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	*2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	*2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	*2	P	
White-fronted Chat <i>Epthianura albifrons</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	*2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	*2	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	*1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	*2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	*1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	*2	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	*2	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+2	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
<i>Mammals:</i>			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinobatus gouldii</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	

Site 24: MALABAR HEADLAND

Location:

Bushland sections of Anzac Rifle Range and coastline between the southern end of Maroubra Beach and the northern side of Long Bay, including vegetated parts of the Malabar Sewerage Treatment Plant and Pioneer Park (refer to Map iii).

Relative Area Size in CMA:

Small

Sub-catchment:

Eastern Beaches

Local Government Area:

Randwick

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	12	9
Remaining Public Land	0	0
Other (including Commonwealth Land)	120	91
Total	132	100

Environmental Setting:



Heathland on the western side of Anzac Rifle Range. M. Schulz/DECC



Coast south of Magic Point, Malabar. M. Schulz/DECC



Sedgeland between Maroubra Beach and Magic Point. M. Schulz/DECC

Malabar Headland incorporates two principal areas of remnant vegetation that are largely separated by a central grassed area comprising the Anzac Rifle Range. Vegetation on the headland includes examples of the Eastern Suburbs Banksia Scrub (an endangered ecological community) as well as other vegetation types associated with Hawkesbury Sandstone. The shoreline primarily comprises cliffines although limited intertidal reef platforms occur, primarily in Long Bay and between Magic Point and Maroubra Beach. Magic and Boora Points are important sites for whale and seabird watching, with over 62 seabird species recorded (Gardner 2006). The intertidal area west of Boora Point on the northern side of Long Bay is part of the Long Bay Intertidal Protected Area (DPI 2005b). It is separated from Botany Bay NP by a discontinuous band of vegetation above the rocky shoreline. The site supports two priority fauna habitats: freshwater wetland and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Nil	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a roosting colony of the threatened Eastern Bentwing-bat; the only locality for single recent sightings of vagrants to the CMA that may once have occurred more regularly i.e. the critically endangered Orange-bellied Parrot and vulnerable Eastern Ground Parrot; and other heathland fauna that were formerly widespread in the Eastern Suburbs, including some species that are rare and/or restricted in distribution within the CMA, such as the Lewin's Rail and Southern Emu-wren.



Roosting Eastern Bentwing-bats in a disused gunnery storage room. M. Schulz/DECC



The origin of the single Ground Parrot is a mystery. M. Schulz



The Nankeen Kestrel is a regularly seen raptor in the site. M. Schulz/DECC

Priority Fauna Species Review:

There have been 151 vertebrate fauna species (excluding fish, marine species, escapees, vagrant shorebirds and terns) documented within this area in the last 10 years: 121 birds, 17 reptiles, 10 mammals and three frogs. Of these one is considered endangered (excluding vagrants) and five as vulnerable (discussed below). A further 32 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Osprey	Vulnerable	2003 (Gardner 2004)	Crown	Several sightings in the Maroubra Beach area in 2003 (Gardner 2004).
**Australian Bustard (VAGRANT)	Endangered	1865 (Hoskin <i>et al.</i> 1991)	Unknown	Vagrant. One bird was shot in May 1865 (Hoskin <i>et al.</i> 1991).
Pied Oystercatcher	Vulnerable	2004 (Gardner 2004)	Crown	Occasionally observed flying along the coast (Gardner 2004).
Sooty Oystercatcher	Vulnerable	2004 (Gardner 2004)	Crown: DPI, DoFA	Occasional individuals forage on exposed reef platforms.
**Rose-crowned Fruit-Dove (VAGRANT)	Vulnerable	1996 (Gardner 2004)	Crown: DoFA	Vagrant. The only record is of an immature in heathland in June 1996 (Gardner 2004).
Swift Parrot	Endangered	2002 (Gardner 2004)	Crown: DoFA	The only record is of five individuals seen in June 2002 (Gardner 2004). Likely to be a very rare visitor to the site.
Eastern Ground Parrot (VAGRANT)	Vulnerable	2006 (Gardner 2006)	Crown: DoFA	The only documented recent record is of a single bird found in a poor condition on Fishermans Road outside the Malabar Sewerage Treatment Plant (Gardner 2006; Lloyd 2006). Subsequent searches, including dusk playbacks in potential habitat have failed to locate additional individuals. Likely to be a vagrant or very rare visitor to the site. Records from the 1800s in this area (Hoskin <i>et al.</i> 1991).
Orange-bellied Parrot (VAGRANT)	Critically Endangered	2003 (Hensen 2003; Hobcroft 2003; Starks 2003)	Crown: DoFA	Vagrant to the Sydney Basin Bioregion (Hoskin <i>et al.</i> 1991; DECC 2007b). The only documented record is of a single immature adjacent to the track to Magic Point from South Maroubra Beach (Hensen 2003). This bird had been banded earlier in the year as a fledgling at Melaleuca Inlet in south-western Tasmania (Starks 2003).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Small numbers forage on a variety of flowering plants in the area in summer and autumn months, targeting a variety of species, including the Red Bloodwood <i>Corymbia gummifera</i> and Coast Banksia <i>Banksia</i>

Species	Threat Category*	Last Recorded	Tenure	Comments
				<i>integrifolia</i> . There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Crown: DoFA	Regularly roost in the decommissioned gunnery emplacements on Malabar Headland (G. Hoye, bat consultant, pers. comm.), with 70+ individuals present in Mar 2007 (Current study). There is currently a study underway investigating roost numbers and other aspects of this species' roosting ecology in the site (White 2007). This study has suggested there are movements of this species between the gunnery emplacements in this site and at Henry Head in Botany Bay NP.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: One cave-dwelling bat roost, tidal shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Habitat loss; increase in distance between unconnected bushland remnants within the site due to habitat loss; lack of habitat connectivity to other bushland remnants; habitat degradation by trail bikes and horses; disturbance due to high public visitation; weed infestation; disturbance to the Eastern Bentwing-bat roost due to uncontrolled public visitation; incorrect gating of gunnery tunnels that may cause the Eastern Bentwing-bat to abandon the site (see Thomson 2002; Gration 2006); impacts of leachate from landfill on wetlands; uncontrolled wildfire.

Moderate: Predation by feral predators (such as the Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; habitat degradation by Rabbits; erosion; entanglement in discarded fishing tackle.



Gunnery buildings and graffiti, Malabar. M. Schulz/DECC



The area has been subjected to a variety of human disturbances over the years. M. Schulz/DECC



Lack of a continuous habitat link south along the coast to Botany Bay NP. M. Schulz/DECC

Land Management:

The site is primarily managed by the Federal Department of Finance and Administration. Additionally adjacent land incorporated within the site includes a number of land owners and managers such as Sydney Water (Malabar Sewerage Treatment Plant), Randwick City Council (Pioneer Park) and DPI Fisheries (with respect to the adjoining Long Bay Intertidal Protected Area and other intertidal areas). There is a proposal for bushland on Malabar Headland to be gazetted as Boora National Park (Friends of Malabar 2002).

References and Further Reading:

DECC (2007b), Friends of Malabar Headland (2002), Gardner (2004, 2006), Gration (2006), Hemmings (2006), Hensen (2003), Hobcroft (2003), Hoskin *et al.* (1991), Keith (2004), Lloyd (2006), NSW DPI Fisheries (2005b), Starks (2003), Thomson (2002), White (2006, 2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – White (2006); +5 – Records from Fauna List, Pioneers Park,

Randwick City Council; +6 – Lloyd (2006); +7 – Gardner (2004); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Gardner 2004).

Legal/Regional Status: CE – Critically Endangered (under TSC Act 1995); E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+4	P	
Reptiles:			
Eastern Snake-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	*	P	RS
Southern Scaly-foot <i>Pygopus lepidopus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+4	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+4	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+4	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+4	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+4	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+4	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+4	P	
Marsh Snake <i>Hemiaspis signata</i>	+4	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Great Egret <i>Ardea alba</i>	+5	P	RS
Eastern Reef Egret <i>Egretta sacra</i>	+2	P	RS
Cattle Egret <i>Ardea ibis</i>	+7	P	
Striated Heron <i>Butorides striatus</i>	+3	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+7	P	
Osprey <i>Pandion haliaetus</i>	+7	V	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Black Kite <i>Milvus migrans</i>	+7	P	
Whistling Kite <i>Haliastur sphenurus</i>	+7	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+6	P	RS

Species	Status	Legal Status	Regional Status
Spotted Harrier <i>Circus assimilis</i>	+7	P	
Swamp Harrier <i>Circus approximans</i>	+7	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Brown Falcon <i>Falco berigora</i>	+2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+3	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+3	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+3	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+3	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+7	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+7	P	
Australian Bustard <i>Ardeotis australis</i>	*1	E1	
Latham's Snipe <i>Gallinago hardwickii</i>	+1	P	RS
Little Curlew <i>Numenius minutus</i>	+7	P	
Whimbrel <i>Numenius arquata</i>	+7	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	+7	P	RS
Wandering Tattler <i>Heteroscelus incanus</i>	+3	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+1	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	+7	V	
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+3	V	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+7	P	
Kelp Gull <i>Larus dominicanus</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+7	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	+3	P	
Common Tern <i>Sterna hirundo</i>	+7	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brush Bronzewing <i>Phaps elegans</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+7	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+3	P	RS
Rose-crowned Fruit-Dove <i>Ptilinopus superbus</i>	*1	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+3	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+7	E1	
Orange-bellied Parrot <i>Neophema chrysogaster</i>	+3	CE	
Eastern Ground Parrot <i>Pezoporus wallicus wallicus</i>	+3	V	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Shining Bronze-Cuckoo <i>Chalcites basalis</i>	+7	P	
Pacific Koel <i>Eudynamys scolopacea</i>	+7	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+7	P	
White-throated Needle-tail <i>Hirundapus caudacutus</i>	+7	P	
Fork-tailed Swift <i>Apus pacificus</i>	+7	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+7	P	
Rainbow Bee-eater <i>Merops ornatus</i>	+7	P	
Dollarbird <i>Eurystomus orientalis</i>	+7	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	+3	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+7	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+7	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+7	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+3	P	
Orange Chat <i>Epthianura aurifrons</i>	+3	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+7	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+7	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+7	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+7	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+7	P	RS
White-winged Triller <i>Lalage tricolor</i>	+3	P	RS
Masked Woodswallow <i>Artamus personatus</i>	+7	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+7	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Eurasian Skylark <i>Alauda arvensis</i>	+1	U	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+7	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+7	U	
European Goldfinch <i>Carduelis carduelis</i>	+7	U	
European Greenfinch <i>Carduelis chloris</i>	+3	U	

Species	Status	Legal Status	Regional Status
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Hirundo nigricans</i>	+7	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+3	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+7	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+2	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	+3	P	RS
Brown Songlark <i>Cincloramphus cruralis</i>	+3	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+2	P	RS
Silveryeye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 25: CHIPPING NORTON

Location:

Georges River and fringing bushland/wetlands from Haigh Park downstream to Newbridge Road (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Liverpool, Fairfield and Bankstown

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	129	28
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	326	72
Total	455	100

Environmental Setting:



Remnant Blue Box woodland, Warwick Farm. M. Schulz/DECC



Chipping Norton Lake. M. Schulz/DECC



Swamp Oak forest remnants are widespread in the site. M. Schulz/DECC

The site is in the upper tidal section of Georges River, some 30 km upstream from Botany Bay. Limited mangroves are present in the Chipping Norton Lakes area and become progressively more common further downstream. The area supports a diversity of vegetation communities located on Quaternary and Tertiary terraces of the Georges River, including woodland, River-flat Eucalypt Forest on Coastal Floodplains, Swamp Oak *Casuarina glauca* forest, natural and artificial wetlands, such as those associated with the Liverpool Sewerage Treatment Plant. The majority of remnant vegetation forms a narrow band fringing the river and is backed by a variety of land uses. A number of vegetation associations that have been identified as endangered ecological communities under the TSC Act 1995, such as Cumberland Plain Woodland, Swamp Oak Floodplain Forest and River-flat Eucalypt Forest on Coastal Floodplains. There are plantings of a variety of non-indigenous plants in some local council reserves within the site. The Georges River and associated wetlands have been substantially modified, with extensive rehabilitative work conducted in some areas, such as the Chipping Norton Lakes (Liverpool City Council 2001). Water quality is an ongoing issue, as demonstrated by the health warning signs erected with respect to swimming and the consumption of the fish caught within the area. The impact of water quality on faunal values in the area is poorly known. The site supports five priority fauna habitats: forested wetland, grassy woodland, alluvial forest and woodland, freshwater wetland, saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Highly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a diverse assemblage of wetland and woodland fauna, including some species, such as the threatened Black-chinned Honeyeater and regionally significant Crested Shrike-tit that have been recorded from few localities within the CMA in the last 10 years.



Grey-headed Flying-fox camp, Cabramatta Creek. M. Schulz/DECC



Active White-bellied Sea-Eagle nest in Forest Red Gum, Warwick Farm. M. Schulz/DECC



Large numbers of Australian Pelicans often roost at the Liverpool Sewerage Treatment Plant. M. Schulz

Priority Fauna Species Review:

There have been 172 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 128 birds, 20 mammals, 14 reptiles and 10 frogs. Of these one is considered endangered and four as vulnerable (these are discussed below). A further 27 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2004 (Atlas record)	Private: Australian Jockey Club	Observed in Apr 2004 at Billabong Pond, Warwick Farm. Also may be present in nearby Horseshoe Pond and other wetlands associated with the Liverpool Sewerage Treatment Plant (Atlas of NSW Wildlife record).
Powerful Owl	Vulnerable	2007 (Current study)	Crown: Liverpool and Fairfield Councils	One observed roosting adjacent to the Grey-headed Flying-fox camp on the edge of Cabramatta Creek in July 2007 (Current study).
**Regent Honeyeater	Endangered	1977 (Regent Honeyeater Recovery Program database)	Uncertain	The last record from the area is of a bird in Sept 1977 in the Warwick Farm area (Regent Honeyeater Recovery Program database). May occasionally visit when autumn and winter flowering trees are in blossom.
Black-chinned Honeyeater	Vulnerable	2007 (Current study)	Private: Australian Jockey Club	2+ individuals recorded in River-flat Eucalypt Forest on Coastal Floodplain dominated by Forest Red Gum <i>Eucalyptus tereticornis</i> with some Blue Box <i>E. baueriana</i> adjacent to the Georges River south of Governor Macquarie Drive in July 2007 (Current study). Additionally a single bird was observed in the same bushland area in Feb 1999 (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Liverpool and Fairfield Councils	A large maternity camp occurs along Cabramatta Creek upstream from the Hume Highway. For 2007, a maximum estimate of 18,952 individuals occupying the camp was made in May (A. Smith, University of Technology,

Species	Threat Category*	Last Recorded	Tenure	Comments
				Sydney, pers. comm.) and over 30,000 in the warmer months of 2007/08 (M. Haberley, Fairfield City Council, pers. comm.). This species forages widely across the site when suitable trees and shrubs are in flower or fruit. Two Fox scats found in July in the Warwick Farm section of the site contained the remains of Grey-headed Flying-foxes (Current study).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread	Recorded from the Liverpool Sewerage Treatment Plant /Billabong Pond area (Current study; Atlas of NSW Wildlife record). This species is likely to range widely across the site, although there are no known roosts within the site.

* As listed under TSC Act 1995; ** only recorded prior to 1997.

Additional Faunal Values: Large maternity camp of the Grey-headed Flying-fox along Cabramatta Creek; colony of intermittently nesting Australian White Ibis along Cabramatta Creek within the Grey-headed Flying-fox camp; wetlands within the Liverpool Sewerage Treatment Plant (and potentially other wetland areas such as Riverside Park) are occasionally used by small numbers of the migratory Latham's Snipe and migratory shorebirds, such as the Common Sandpiper have previously been recorded along the Georges River.

Identified Threats to Fauna Values:

High: Limited habitat link with remnant vegetation in upstream and downstream sections of the Georges River, such as the Georges River NP; habitat discontinuity within the site, particularly due to the formation of extensive parkland landscapes and mowed areas; removal of dead trees and live trees with hollows in some park areas; mowing under stands of trees that prevents regeneration and the development of native shrubs and ground layer vegetation; water quality; disturbance to wildlife by watercraft and widespread access along the banks of the river; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Bush regeneration activities resulting in the removal of shrubby weeds such as *Lantana camara* that may result in the loss of species requiring dense cover, such as the Eastern Whipbird; disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping; impact of Australian White Ibis colony on the Grey-headed Flying-fox camp on Cabramatta Creek.



Most remnant vegetation in the site forms a narrow band between the river and manicured parklands. M. Schulz/DECC



Extensive reedbeds provide habitat for a variety of birds uncommon in the CMA. M. Schulz/DECC



Water quality has an unknown impact on fauna values in the site. M. Schulz/DECC

Land Management:

The site primarily comprises land managed by the three local councils. Important bushland remnants and wetlands in the Governor Macquarie Drive area are managed by the Australian Jockey Club (Warwick Farm) and Sydney Water (Liverpool Sewerage Treatment Plant).

References and Further Reading:

Bewsher Consulting (2004), Bankstown City Council (2002b), Cabramatta Creek Flying-fox Committee (2007), DEC (2005b), DECC (2005), Ecotone Ecological Consultants (2005), Fairfield Council (2006, 2007), Hoskin *et al.* (1991), Keith (2004), Liverpool City Council (2001, 2003), NSW National Parks and Wildlife Service (2001c, d), Tidemann & Spence (1995), Water Resources Consulting Services (1997).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Staff at the Liverpool Sewerage Treatment Plant and Warwick Farm; +5 – Fairfield City Council (2007); +6 – Ecotone Ecological Consultants (2005); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – records prior to 1997 (Regent Honeyeater Recovery Program database, DECC); *3 – only recorded prior to 1997 (Hoskin *et al.* 1991).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Haswell's Froglet <i>Paracrinia haswelli</i>	+2	P	RS
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+1	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+2	P	
Reptiles:			
Red-eared Slider <i>Trachemys scripta elegans</i>	+4	U	
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	*	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+4	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	

Species	Status	Legal Status	Regional Status
Australasian Shoveler <i>Anas rhynchotis</i>	+1	P	RS
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Great Crested Grebe <i>Podiceps cristatus</i>	+2	P	RS
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+2	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+2	P	
Cattle Egret <i>Ardea ibis</i>	+1	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Baillon's Crake <i>Porzana pusilla</i>	+2	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	+4	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	*	P	RS
Black-winged Stilt <i>Himantopus himantopus</i>	+1	P	
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	+1	P	
Black-fronted Dotterel <i>Elseyaornis melanops</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
White-winged Black Tern <i>Chlidonias leucopterus</i>	*3	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Cockatiel <i>Nymphicus hollandicus</i>	*	P	Escapee?
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+6	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*1	E1	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	*	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	+1	V	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+1	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+1	U	
Zebra Finch <i>Taeniopygia guttata</i>	*	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	*	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
European Goldfinch <i>Carduelis carduelis</i>	+1	U	
European Greenfinch <i>Carduelis chloris</i>	*	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
White-backed Swallow <i>Cheramoeca leucosternus</i>	*	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+6	P	
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Platypus <i>Ornithorhynchus anatinus</i>	+2	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Little Red Flying-fox <i>Pteropus scapulatus</i>	+5	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+6	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	*	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 26: MENAI

Location:

The site is situated between Holsworthy Military Reserve to the west, Georges River NP to the north, Barden Ridge, Menai and the Woronora River valley to the east and the Regional Waste Disposal Depot and ANSTO land to the south (refer to Map iii).

Relative Area Size in CMA:

Large

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	10	1
Crown Land	752	62
Commonwealth Land	168	14
Remaining Public Land	0	0
Other	275	23
Total	1205	100

Environmental Setting:



Flowering Waratah in gully woodland along tributary of Bardens Creek. M. Schulz/DECC



Vegetation along Bardens Creek. M. Schulz/DECC



Small treeless heathlands are scattered through the site. M. Schulz/DECC

This site varies from little to highly disturbed vegetation communities characteristic of slopes and ridges on Hawkesbury Sandstone. Watercourses in the site, such as Bardens and Mill Creeks are situated in deeply incised valleys of Hawkesbury Sandstone. The site is important in linking Georges River NP (apart from Heathcote Road easement) to a much larger protected area system that extends from Royal NP in the north, Budderoo and Morton NP in the south and Nattai and Blue Mountains NP in the west (NSW National Parks and Wildlife Service 2000a). Overall water quality of the major watercourses is poor due to stormwater runoff from the upslope suburbs of Barden Ridge, Menai; Heathcote Road; and leachate from the Regional Waste Disposal Depot. The site suffers from a high fire frequency, with much of the area burnt in 2001. The site supports one priority fauna habitat: coastal heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a moderately diverse assemblage of Hawkesbury Sandstone fauna, including threatened species such as the Giant Burrowing Frog, Red-crowned Toadlet, Rosenberg's Goanna and Grey-headed Flying-fox.



The Blue Mountains Tree Frog, a species with restricted distribution in the CMA occurs along Bardens Creek. M. Schulz



Small numbers of Yellow-tufted Honeyeaters occur in woodland along the major watercourses. DECC



The status of the regionally significant Red-naped Snake is unknown within the site. N. Williams

Priority Fauna Species Review:

There have been 139 vertebrate fauna species (excluding fish and unconfirmed species) documented within this area in the last 10 years: 92 birds, 22 reptiles, 15 mammals and 10 frogs. Of these one is considered endangered and six as vulnerable (see table below). A further 24 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Giant Burrowing Frog	Vulnerable	2002 (Atlas record)	Crown Reserve	Status uncertain. Recorded on the plateau east of Mill Creek (Atlas of NSW Wildlife records).
Red-crowned Toadlet	Vulnerable	2002 (Atlas record)	Crown Reserve	As for the previous species.
Green and Golden Bell Frog	Endangered	2002 (Atlas record)	Crown Reserve	Recorded on the plateau east of Mill Creek (Atlas of NSW Wildlife records). Current status in the area is unknown; not listed as a current locality in the draft recovery plan for the species (DEC 2005b).
Rosenberg's Goanna	Vulnerable	2007 (M. Schulz, unpublished records)	Crown Reserve	Status uncertain. One dead individual on Heathcote Road in Feb 2007 (M. Schulz, unpublished records).
Powerful Owl	Vulnerable	2005 (Atlas record)	Crown Reserve	Status uncertain. One record (Atlas of NSW Wildlife record).
Koala	Vulnerable	2005 (Atlas record)	Widespread	Status uncertain. Scattered records, including along Heathcote Road and west of Mill Creek (Atlas of NSW Wildlife records).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	This species forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995.

Additional Faunal Values: Nil

Identified Threats to Fauna Values:

High: Habitat loss; habitat loss in adjoining Commonwealth lands (particularly Holsworthy Military Reserve); fire frequency and extent; water quality both from stormwater runoff, Regional Waste Disposal Depot and ANSTO; air quality from ANSTO and the Regional Waste Disposal Depot; weed infestation; habitat degradation by trail bikes, mountain bikes and off-road vehicles.

Moderate: Road mortality on Heathcote Road; tree dieback; disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Fox, Feral Dog and Feral Cat); bush rock removal; erosion; competition for hollows by feral Honeybees *Apis mellifera*; rubbish dumping.



Water quality of the site's watercourses is impacted by land uses on the catchment fringes. M. Schulz/DECC



Numerous trail bike and off-road vehicle tracks occur across the site. M. Schulz/DECC



The site forms an important link between the Georges River NP and bushland to the south of Heathcote Road. M. Schulz/DECC

Land Management:

The site primarily comprises land owned by the Gandangara Corporation and Crown land, including Department of Defence land and parts of the ANSTO scientific reserve in the far south. Private land occurs adjacent to Heathcote Road north of the Regional Waster Disposal Depot.

References and Further Reading:

Bannister (2005), DEC (2005b), Keith (2004), National Parks Association of NSW (1992), NSW National Parks and Wildlife Service (2000a, 2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 – M. Schulz (unpublished records from observations along Heathcote Road); +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – G. Madani, DECC, pers. comm.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Giant Burrowing Frog <i>Heleioporus australiacus</i>	+2	V	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Blue Mountains Tree Frog <i>Litoria citropa</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+4	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Mountain Heath Dragon <i>Rankinia diemensis</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+1	V	
Lace Monitor <i>Varanus varius</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Southern Death Adder <i>Acanthophis antarcticus</i>	+2	P	RS
Red-naped Snake <i>Furina diadema</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+2	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Rock Dove <i>Columba livia</i>	+2	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Common Bronzewing <i>Phaps chalcoptera</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+1	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+2	P	RS
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+2	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	

Species	Status	Legal Status	Regional Status
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+2	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Beautiful Firetail <i>Stagonopleura bella</i>	+2	P	RS
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Silvereye <i>Zosterops lateralis</i>	+2	P	
Bassian Thrush <i>Zoothra lunulata</i>	+2	P	RS
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 27: WORONORA RIVER

Location:

Woronora River and fringing bushland from Prince Edward Park upstream to north of Heathcote Road, including bushland on ANSTO Lucas Heights Research Laboratories (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

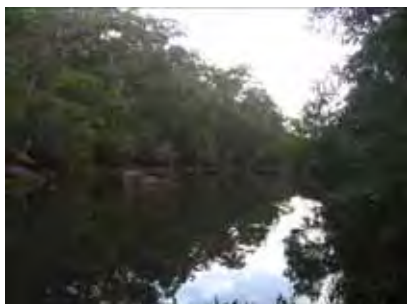
Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	556	58
Commonwealth Land	122	13
Remaining Public Land	0	0
Other	275	29
Total	953	100

Environmental Setting:



Upper Woronora River above The Needles. M. Schulz/DECC



Alluvial woodland adjacent to the Woronora River. M. Schulz/DECC



Crystal clear water, Loftus Creek. M. Schulz/DECC

The site is characterised by deeply incised valleys of the Woronora River, Loftus and Forbes Creeks fringed by urban and industrial development on the valley crests and upper ridges, such as in the Barden Ridge and Woronora Heights areas. Below 'The Needles' the Woronora River valley becomes more open, with a varying width band of river flats resulting in areas of urban development occurring along the edge of the river, such as in the suburb of Woronora. This site generally comprises little to moderately disturbed vegetation communities characteristic of the slopes and smaller watercourses on Hawkesbury Sandstone (Keith 2004). Vegetation on the valley crest above the western side of the Woronora River on ANSTO lands comprises stands of woodland with a more westerly influence growing on Mittagong Formation shales and sandstones. The river is tidal upstream to the Pass of Sabugal near 'The Needles'. White Mangroves *Avicennia marina* are patchily and poorly formed in this section of the river with no well developed mudflats exposed at low tide. In low-lying areas adjacent to the lower reaches of major watercourses stands of the endangered ecological community, Swamp Oak *Casuarina glauca* forest occur. The site is linked continuously (apart from Heathcote Road easement) upstream along the Woronora River to Heathcote NP and forms a section of the Liverpool to Appin fauna corridor. The only major breaks in habitat within the site are Heathcote Road and the Water Supply pipeline easement from Woronora Dam. Overall water quality of the Woronora River is poorly known but after rain is of poor condition in some areas, such as adjacent to stormwater outlets due to the overflow of the sewerage system and stormwater runoff (WBM 2007). The site supports three priority fauna habitats: forested wetland, alluvial forest and woodland and coastal heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a diverse assemblage of riverine and Hawkesbury Sandstone woodland fauna, with some more westerly species occurring in Mittagong Formation vegetation communities in the ANSTO area, including a number of threatened species such as the Red-crowned Toadlet, Rosenberg’s Goanna, Black Bittern, Powerful Owl, Sooty Owl, Koala and Southern Myotis.



Sooty Owl prey remains, "Cathedral" roost site adjacent to the Woronora River. M. Schulz/DECC



Black Bittern habitat along Forbes Creek. M. Schulz/DECC



The status of the Heath Monitor is uncertain within the site. M. Schulz

Priority Fauna Species Review:

There have been 175 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 115 birds, 25 reptiles, 24 mammals and 11 frogs. Of these nine are considered vulnerable (excluding vagrants; discussed below). A further 28 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	1998 (Atlas record)	Crown Reserve	Current status uncertain. Recorded from upslope of the Woronora River adjacent to Bundanoon Road, Woronora Heights. in Dec 1995 – Jan 1996 (Atlas of NSW Wildlife).
Rosenberg’s Goanna	Vulnerable	2005 (J. Bannister, ANSTO, pers. comm.)	Crown: ANSTO	Current status uncertain. Observed in recent years in heathland in the ANSTO buffer zone (J. Bannister, ANSTO, pers comm.). An old record from the escarpment in the Barden Ridge area in 1976 (Atlas of NSW Wildlife record).
Black Bittern	Vulnerable	2007 (Current study)	Crown Reserve	Current status uncertain. A single individual observed downstream of the confluence of Forbes and Loftus Creeks in May 2007 (Current study).
Powerful Owl	Vulnerable	2007 (Current study)	Widespread	Pairs occur in the Woronora River, upper and lower Forbes and Loftus Creek valleys. At least two nesting pairs are known from the site in the last two areas (R. Jackson, pers. comm.).
Barking Owl (VAGRANT)	Vulnerable	1998 (Atlas record)	Crown Reserve	There is a record of this owl upslope of the Woronora River adjacent to Bundanoon Road, Woronora Heights. This species is extremely rare in the CMA (e.g. DECC 2007b).
Sooty Owl	Vulnerable	2006 (R. Jackson, pers. comm.)	Crown Reserve	Current status uncertain. Two known roosts in rock overhangs within the site (see Kavanagh & Jackson 1997) had no recent indications of pellets or droppings in visits in Jul 2007 (Current study). A radio-tagged individual that utilised these overhangs also roosted and fed in Royal NP and on the north side of Port Hacking. This individual moved from Forbes Creek to Royal NP by crossing the Princes Hwy in the

Species	Threat Category*	Last Recorded	Tenure	Comments
				Engadine High School area where it was twice hit by cars and handed in to WIRES. The two known roosts have been subject to degradation associated with human visitation: the 'Cathedral' site had signs of frequent visitation and a tree at the entrance had been removed, and on Forbes Creek there was evidence of recent visitation and occupation in nearby overhangs.
**Diamond Firetail	Vulnerable	1984-87 (Martin 1984-1987, cited in Bannister 1995)	Crown: ANSTO	The only records were in the mid-1980s from the ANSTO area (Martin 1984-1987, cited in Bannister 1995). Likely to be a very rare visitor to the western edges of the site.
Koala	Vulnerable	2006 (Atlas record)	Crown Reserve; Sutherland Shire Council; private	Status uncertain. There are a number of recent records from the site, particularly from slopes above the lower reaches of Forbes Creek and adjacent to the Woronora River in the Pass of Sabugal area (Atlas of NSW Wildlife records). However, within other sections of the site, such as the ANSTO buffer zone this species has not been recorded (Bannister 1995; J. Bannister, ANSTO, pers. comm.).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	This species forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Crown Reserve	Two individuals were located roosting in honeycomb weathering in the 'Cathedral' overhang in July 2007 (Current study). There are likely to be other roosts within the site as this species has been trapped along the Sydney Water pipeline easement below Cooriengah Heights in May 2007 (Current study) and recorded upslope of the Woronora River adjacent to Bundanoon Road (Atlas of NSW Wildlife record).
Southern Myotis	Vulnerable	2007 (Current study)	Foraging habitat along major watercourses: Crown	Status uncertain. Three individuals were trapped over the Woronora River at the Pass of Sabugal in May 2007 (Current study). This species is likely to roost within the site

* As listed under TSC Act 1995; ** only recorded prior to 1997.

Additional Faunal Values: Cave-dwelling bat roost located in overhang (Note: there are likely to be other cave-dwelling bat roosts within the site).

Identified Threats to Fauna Values:

High: Habitat discontinuity within parts of the site, particularly along the Woronora River in the Woronora area; habitat loss in the adjoining Holsworthy Military Reserve; fire frequency and extent, including impact of fuel reduction burns (such as on Powerful Owl nest trees); water quality both from stormwater runoff and ANSTO; air quality from ANSTO and the nearby Regional Waste Disposal Depot; disturbance to wildlife and bank erosion by watercraft in the lower sections of the river within the site; potential bird strike from overhead powerlines crossing the Woronora River; weed infestation; disturbance of rock overhangs to roosting Sooty Owls and other significant species, including removal of vegetation at entrance of some key overhangs by rock climbers.

Moderate: Habitat degradation by trail bikes; tree dieback; disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); predation by domestic cats; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping.



Along sections of the Woronora River continuous vegetation is broken by housing development to the waterline. M. Schulz/DECC



Tree dieback in alluvial woodland adjacent to the Woronora River. M. Schulz/DECC



Fuel reduction burns in the area threatens known Powerful Owl nest sites, such as in the Loftus Creek valley. M. Schulz/DECC

Land Management:

The site primarily comprises crown land (including ANSTO) and areas managed by Sutherland Shire Council, such as Prince Edward Park. Private land occurs mostly in small parcels of land fringing parts of the site or along sections of the Woronora River such as in the Woronora area. The privately owned Camp Wanawong borders the lower reaches of Loftus Creek. There are a number of easements bisecting the site managed by a variety of companies and government agencies, such as the water pipeline from Woronora Dam managed by Sydney Water.

References and Further Reading:

Bannister (2005), DECC (2007b), Jackson & Kavanagh (1997), Kavanagh & Jackson (1997), Keith (2004), NSW National Parks and Wildlife Service (2001d), WBM (2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – D. Andrew, DECC, unpublished records; +5 – J. Bannister, ANSTO, unpublished records; +6 – R. Jackson, unpublished records; +7- Kavanagh & Jackson (1997); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Bannister 1995).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Smooth Toadlet <i>Uperoleia laevigata</i>	+2	P	RS
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Freycinet's Frog <i>Litoria freycineti</i>	+2	P	RS
Broad-palmed Rocket Frog <i>Litoria latopalmata</i>	+2	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+2	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*1	P	
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	*1	P	RS

Species	Status	Legal Status	Regional Status
Burton's Legless-lizard <i>Lialis burtonis</i>	*1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+5	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	+5	V	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	*1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+6	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+4	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+5	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	*1	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	*1	P	
Eastern Bandy-bandy <i>Vermicella annulata</i>	+5	P	RS
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	*1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+2	P	
Intermediate Egret <i>Ardea intermedia</i>	+2	P	
Black Bittern <i>Ixobrychus flavicollis</i>	+1	V	
Australian White Ibis <i>Threskiornis molucca</i>	+2	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	*1	P	

Species	Status	Legal Status	Regional Status
Black-shouldered Kite <i>Elanus axillaris</i>	*1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+1	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+5	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	*1	P	RS
Brown Falcon <i>Falco berigora</i>	*1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	*1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+2	P	
Painted Button-quail <i>Turnix varia</i>	*1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	*1	P	
Common Tern <i>Sterna hirundo</i>	+2	P	RS
Rock Dove <i>Columba livia</i>	+2	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+2	P	RS
Common Bronzewing <i>Phaps chalcoptera</i>	*1	P	RS
Brush Bronzewing <i>Phaps elegans</i>	*1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	*1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+2	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	*1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+2	P	
Pheasant Coucal <i>Centropus phasianinus</i>	*1	P	RS
Powerful Owl <i>Ninox strenua</i>	+1	V	
Barking Owl <i>Ninox connivens</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Sooty Owl <i>Tyto tenebricosa</i>	+7	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+5	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Forest Kingfisher <i>Todiramphus macleayii</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	*1	P	RS
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
Pilotbird <i>Pycnoptilus floccosus</i>	*1	P	RS
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Chestnut-rumped Heathwren <i>Hylacola pyrrhopygia</i>	*1	P	RS
Weebill <i>Smicronis brevirostris</i>	*1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	*1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	*1	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	*1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	*1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	*1	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Jacky Winter <i>Microeca fascinans</i>	+2	P	RS
Scarlet Robin <i>Petroica multicolor</i>	+2	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	*1	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+6	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-winged Triller <i>Lalage tricolor</i>	*1	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	*1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	*1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	*1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Diamond Firetail <i>Stagonopleura guttata</i>	*1	V	
European Goldfinch <i>Carduelis carduelis</i>	*1	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	*1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Golden-headed Cisticola <i>Cisticola exilis</i>	*1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+1	P	RS
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	*1	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Feathertail Glider <i>Acrobates pygmaeus</i>	*1	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Large Forest Bat <i>Vespadelus darlingtoni</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
Water Rat <i>Hydromys chrysogaster</i>	*1	P	RS
House Mouse <i>Mus musculus</i>	+5	U	
Swamp Rat <i>Rattus lutreolus</i>	+2	P	RS
Bush Rat <i>Rattus fuscipes</i>	+1	P	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+5	U	
Rabbit <i>Oryctolagus cuniculus</i>	+5	U	
Brown Hare <i>Lepus capensis</i>	+5	U	
Feral Goat <i>Capra hircus</i>	*1	U	

Site 28: HAMMONDVILLE - PLEASURE POINT

Location:

Georges River and fringing bushland from Newbridge Road bridge, Milperra downstream to the Picnic Point–Sandy Point area, including various reserves such as the Vale Of Ah Reserve, Deepwater Regional Park and Lieutenant Cantello Reserve (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Bankstown and Liverpool

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	16	3
Commonwealth Land	58	9
Remaining Public Land	0	0
Other	544	88
Total	618	100

Environmental Setting:



Remnant Cumberland Plain woodland, Lieutenant Cantello Reserve. M. Schulz/DECC



A variety of wetlands occur adjacent to the Georges River, such as this Common Reed swamp. M. Schulz/DECC



Forested wetlands dominated by Swamp Oak are widespread in the site. M. Schulz/DECC

The site is located in the upper tidal section of the Georges River, some 20 km upstream from Botany Bay. The area supports a diversity of vegetation communities located on Tertiary terraces of the Georges River downstream to the Deepwater RP area, including a number of endangered ecological communities listed under the TSC Act 1995, such as Shale Gravel Transition Forest, River-flat Eucalypt Forest on Coastal Floodplains, Swamp Oak *Casuarina glauca* Floodplain Forest and Sydney Freshwater Wetlands. The floodplain in this stretch of the Georges River still supports important wetlands that elsewhere (e.g. Chipping Norton site) have been primarily mined, drained for housing estates or landfilled and transformed into playing fields. Further downstream the diverse vegetation of the Tertiary terraces gives way to vegetation communities typical of the rolling hills and rises associated with Hawkesbury Sandstones. A narrow band of mangroves occur along much of this section of the Georges River, although no extensive stands are present as seen further downstream. The majority of remnant vegetation forms either a narrow band fringing the river or more extensive patches, including some that directly link with Holsworthy Military Reserve along Harris, Williams and Deadmans Creeks. Continuous vegetation along this section of the river is disrupted in a number of places, such as at East Hills and Pleasure Point due to the presence of waterfront houses. There are a number of council reserves within the area, some supporting high quality habitat remnants supplemented by varying levels of bush regeneration works involving weed removal and strategic revegetation. Other reserves are highly modified park-like landscapes with scattered remnant trees, no shrub layer but a mowed grass ground layer, such as Pleasure Point Reserve. This section of the Georges River has been identified as an important habitat corridor for species, such as the Koala (e.g. Bankstown City Council 2004a; DEC 2005c). Additionally, vegetated creeklines between the river and Holsworthy Military Reserve form an important fauna link with extensive areas of high quality fauna habitat to the south. The site supports six priority fauna habitats: forested wetland, alluvial forest and woodland, grassy woodland, heathland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports a mixed assemblage of fauna associated with Hawkesbury Sandstone, riverine and Cumberland Plain vegetation communities, including a key population of the endangered Green and Golden Bell Frog and habitat for a number of other threatened species such as the Koala and East-coast Freetail-bat.



The Azure Kingfisher occurs in small numbers along the Georges River. M. Schulz



Few fauna occur in highly modified sections except for common species such as the Australian Wood Duck. M. Schulz/DECC



A number of reptiles occur within the site, such as the Red-bellied Black Snake. N. Williams

Priority Fauna Species Review:

There have been 175 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 123 birds, 21 mammals, 20 reptiles and 11 frogs. Of these two are considered endangered (excluding vagrants and unconfirmed species) and three as vulnerable (these are discussed below). A further 27 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: Sydney Water; Bankstown City Council	Status uncertain. Several recent records in Apr 2003 from William Creek and Deepwater RP areas (Atlas of NSW Wildlife records). Individuals present within the site form an important component of the Hammondville key population (DEC 2005b). This population has undergone severe declines in recent years, with no recent records from a number of localities such as Lieutenant Cantello Reserve.
Black-necked Stork (Jabiru) (VAGRANT)	Endangered	2006 (Atlas record)	Bankstown City Council	Vagrant to the Sydney Basin Bioregion (Hoskin <i>et al.</i> 1991). A single individual observed at Deepwater RP in Nov 2006 (Atlas of NSW Wildlife record).

Species	Threat Category*	Last Recorded	Tenure	Comments
**Square-tailed Kite	Vulnerable	1992 (Bankstown City Council fauna database)	Bankstown City Council	Recorded from Deepwater RP in 1992 (Bankstown City Council fauna database). Likely to occur as a very rare visitor within the site.
Regent Honeyeater	Endangered	2000 (Atlas record)	Bankstown City Council	Rare visitor. The only documented recent record is of five individuals in Deepwater RP in May 2000 (Atlas of NSW Wildlife record). Also earlier records from this reserve, such as in Sept 1977 (Regent Honeyeater Recovery Program database, DECC).
**Black-chinned Honeyeater	Vulnerable	1994 (Bankstown City Council fauna database)	Bankstown City Council	Recorded from Lambeth Reserve in 1994 (Bankstown City Council fauna database). Likely to occur as a very rare visitor within the site.
Koala	Vulnerable	2006 (Atlas record)	Various (including Liverpool City Council)	Occasional individuals recorded on the western side of the Georges River, particularly in the Pleasure Point and Williams Creek areas (Atlas of NSW Wildlife records). Individuals are occasionally roadkilled on Heathcote Road, particularly adjacent to Deadmans Creek.
Grey-headed Flying-fox	Vulnerable	1999 (Atlas record)	Widespread	Likely to be a regular visitor in varying numbers when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	2005 (Atlas record)	Private (although likely to forage widely)	Detected using Anabat on the western side of the Georges River at Moorebank in July 2005 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern False Pipistrelle (UNCONFIRMED)	Vulnerable	1999 (Atlas record)	Crown: Sydney Water	Detected using Anabat in the Holsworthy Sewerage Treatment Plant area in Oct 1999 (Atlas of NSW Wildlife record). The ultrasonic signals of this species are readily confused with those of the Greater Broad-nosed Bat and the Gould's Wattled Bat (Pennay <i>et al.</i> 2004; H. Parnaby, DECC, pers. comm.; R. Williams, Ecotone, pers. comm.). Therefore, due to the absence of trapped individuals, all ultrasonic calls in the coastal region of the Sydney Basin Bioregion are regarded as unconfirmed (DECC 2007b).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Wetlands within the site are used by small numbers of the migratory Latham's Snipe (especially in Deepwater RP). The Cumberland Plain Land Snail *Meridolum*

corneovirens listed as Endangered under the TSC Act 1995 has been recorded in the site (Atlas of NSW Wildlife record).

Identified Threats to Fauna Values:

High: Habitat loss, such as associated with new developments; habitat discontinuity within parts of the site, particularly where houses front the river, such as in the East Hills–Pleasure Point area; loss of continuous habitat links with Holsworthy Military Reserve; habitat loss in the adjoining Holsworthy Military Reserve; water quality, including from stormwater and industrial runoff; increased sedimentation; disturbance to wildlife and bank erosion by watercraft and widespread access along the banks of the river; impacts of fire; weed infestation; housing encroachment on to remnant habitat; tree dieback; road mortality; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); habitat disturbance by Rabbits; disturbance by uncontrolled domestic dogs; predation by wide-ranging domestic cats; erosion; bushrock removal; competition for hollows by feral Honeybees *Apis mellifera*; potential bird strike from overhead powerlines crossing the Georges River; entanglement in discarded fishing tackle.



Off road vehicle and trail bike tracks are common in some sections of remnant bushland, such as in the Voyager Point area. M. Schulz/DECC



Vegetation is not continuous in some sections due to the presence of waterfront houses and highly modified park-like landscapes, such as Pleasure Point Reserve. M. Schulz/DECC



Watercourses link the site with bushland in the nearby Holsworthy Military Area but are disrupted by the busy Heathcote Road resulting in many roadkills. M. Schulz/DECC

Land Management:

The tenure of this site is complex. It includes a number of reserves managed by Bankstown and Liverpool City Councils, including Vale of Ah Reserve, Lieutenant Cantello Reserve, Deepwater Regional Park, Kelso Park and Lambeth Reserve. There are several golf courses in the site, upstream of the M5 Motorway: Riverlands and New Brighton Golf Courses. Sections of land fronting on to the Georges River are privately owned, such as in the Moorebank, East Hills and Pleasure Point areas. There are a number of roads and easements bisecting the site, the latter managed by a variety of companies and government agencies. All habitat links with Holsworthy Military Area are bisected by Heathcote Road.

References and Further Reading:

Bankstown City Council (2002b, 2004a, 2006), DEC (2005b, c), Hoskin *et al.* (1991), Keith (2004), Liverpool City Council (2003, 2007), NSW National Parks and Wildlife Service (2001c, d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3– Records from various observers posted on the Birding-aus website; +4 – Nest box monitoring, Deepwater RP and Lambeth Reserve (K. Godfrey, Bankstown City Council, pers. comm.); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Bankstown City Council fauna database); *3 – only recorded prior to 1997 (Hoskin *et al.* 1991).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Brown Toadlet <i>Pseudophryne bibronii</i>	+1	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+2	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+1	P	
Reptiles:			
Eastern Snake-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Golden-crowned Snake <i>Cacophis squamulosus</i>	+2	P	RS
Yellow-faced Whipsnake <i>Demansia psammophis</i>	+1	P	
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Musk Duck <i>Biziura lobata</i>	*2	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	+2	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	

Species	Status	Legal Status	Regional Status
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+2	P	
Pied Cormorant <i>Phalacrocorax varius</i>	*2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+2	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+2	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	*2	P	
Great Egret <i>Ardea alba</i>	+2	P	RS
Intermediate Egret <i>Ardea intermedia</i>	*2	P	
Cattle Egret <i>Ardea ibis</i>	*2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	*2	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	*2	P	
Black-necked Stork (Jabiru) <i>Ephippiorhynchus asiaticus</i>	+2	E1	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Square-tailed Kite <i>Lophoictinia isura</i>	*2	V	
Whistling Kite <i>Haliastur sphenurus</i>	*2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Australian Hobby <i>Falco longipennis</i>	*2	P	
Peregrine Falcon <i>Falco peregrinus</i>	*2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+2	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Black-tailed Native-hen <i>Gallinula ventralis</i>	*3	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	+2	P	RS
Black-winged Stilt <i>Himantopus himantopus</i>	+2	P	
Red-capped Plover <i>Charadrius ruficapillus</i>	*2	P	RS
Black-fronted Dotterel <i>Elsayornis melanops</i>	+2	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+2	P	
Whiskered Tern <i>Chlidonias hybridus</i>	*2	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Common Bronzewing <i>Phaps chalcoptera</i>	*2	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+2	P	

Species	Status	Legal Status	Regional Status
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chlorolepidotus</i>	*2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	*2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	*2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+3	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+2	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Weebill <i>Smicronis brevirostris</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+2	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Striped Honeyeater <i>Plectorhyncha lanceolata</i>	*3	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	+2	E1	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	*2	V	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Brown Honeyeater <i>Lichmera indistincta</i>	+2	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	*2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	*1	P	
Jacky Winter <i>Microeca fascinans</i>	*2	P	RS
Flame Robin <i>Petroica phoenicea</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	+2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	*2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	*2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*2	P	RS
Cicadabird <i>Coracina tenuirostris</i>	*2	P	
White-winged Triller <i>Lalage tricolor</i>	*2	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Masked Woodswallow <i>Artamus personatus</i>	*2	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	*2	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	*1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Zebra Finch <i>Taeniopygia guttata</i>	*2	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+2	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	*2	U	
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	*2	P	RS
European Goldfinch <i>Carduelis carduelis</i>	*2	U	

Species	Status	Legal Status	Regional Status
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	*1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+2	P	
Little Grassbird <i>Megalurus gramineus</i>	+2	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	*2	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+2	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	*2	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	*2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+4	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+2	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	+2	V	Unconfirmed
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+2	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	*1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 29: LONG POINT – CASULA

Location:

The western bank of the Georges River and fringing bushland from Long Point downstream to the M5 Motorway bridge in Casula, including Leacock Regional Park and a section of Georges River Nature Reserve (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Campbelltown and Liverpool

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	27	7
Crown Land	0	0
Commonwealth Land	14	4
Remaining Public Land	0	0
Other	334	89
Total	375	100

Environmental Setting:



The Georges River at Simmo's Beach Recreation Reserve. M. Schulz/DECC



Extensive rock outcrops in Smooth-barked Apple woodland above the Georges River. M. Schulz/DECC



Recently burnt low woodland on the plateau top above the Georges River valley. M. Schulz/DECC

The site comprises a narrow band of remnant vegetation on the western side of the Georges River, immediately adjacent to extensive Department of Defence lands including Holsworthy Military Reserve, Steele Barracks and Moorebank Military Reserve. The landscape is dominated by vegetation communities associated with narrow incised valleys of Hawkesbury Sandstone along the Georges River and larger creek systems. The incised watercourses are backed by gently undulating crests, ridges and plateau surfaces of Mittagong formation. In the lower reaches of the site where the Georges River floodplain is more extensive, vegetation communities include remnant River-flat Eucalypt Forest on Coastal Floodplains, Swamp Oak *Casuarina glauca* Floodplain Forest and Sandstone/Shale Transition Forest. The majority of remnant vegetation forms a variable width band fringing the Georges River, with more extensive patches extending along Bunbury Curran and Glenfield Creeks. Levels of weed infestation are high in some areas. There are a number of council reserves within the area, some supporting high quality habitat remnants, such as Simmo's Beach Recreation Reserve. The water quality of the river is poor after rain due to stormwater and septic runoff as evidenced by signs erected at popular swimming locations, such as Simmo's Beach Recreation Reserve. This site is located on the western edge of a much larger protected area system that extends from Royal NP in the north and Budderoo and Morton NP in the south (NSW National Parks and Wildlife Service 2000a). The site supports three priority fauna habitats: forested wetland, alluvial forest and woodland and grassy woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna</i>	Very High

Fauna Overview: This site supports a mixed assemblage of fauna associated with Hawkesbury Sandstone and riverine vegetation communities, including a number of threatened species, such as the Green and Golden Bell Frog, Swift Parrot, Powerful Owl and Southern Myotis.



The White-winged Chough is an occasional visitor from Steele Barracks to the east of the site. N. Williams



A diverse bat fauna has been recorded in the Leacock RP, including the threatened Greater Broad-nosed Bat. N. Williams



The Spotted Grass Frog is common on the Georges River floodplain in the Casula area. N. Williams

Priority Fauna Species Review:

There have been 171 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 123 birds, 23 mammals, 17 reptiles and eight frogs. Of these two are considered endangered and five as vulnerable (these are discussed below). A further 14 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2003 (Atlas record)	Crown: DECC	Status uncertain. One recent documented record from Casula Swamp in Leacock RP in Apr 2003 (Atlas of NSW Wildlife record). Individuals present within the site may form part of the Georges River key population (DEC 2005b). This population has undergone severe declines in recent years.
Swift Parrot	Endangered	2006 (Atlas record)	Crown: DECC	Occasional visitor, mainly when Swamp Mahogany <i>E. robusta</i> are in flower. For example, several birds observed flying between Leacock RP and Moorebank Military Reserve in May 2006 (DEC 2006).
Powerful Owl	Vulnerable	2006 (Atlas record)	Crown: DECC	Status uncertain. One heard in Leacock RP in Aug 2006 (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2006 (Atlas record)	Widespread	Likely to be a regular visitor in varying numbers when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	2006 (Atlas record)	Crown: DECC	Detected using Anabat in Leacock RP (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Southern Myotis	Vulnerable	2006 (Atlas record)	Crown: Georges River and DECC	This species has been trapped in Leacock RP and on the edge of the Georges River downstream from the

Species	Threat Category*	Last Recorded	Tenure	Comments
				Glenfield Waste Disposal area (DEC 2006; Atlas of NSW Wildlife records). No documented roosts within the site.
Greater Broad-nosed Bat	Vulnerable	1998 (Atlas record)	Crown: DECC	Status uncertain. One recent record from Leacock RP in Jan 1998 (Atlas of NSW Wildlife record).

* As listed under TSC Act 1995.

Additional Faunal Values: Occasionally used by small numbers of migratory shorebirds along Georges River. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Atlas of NSW Wildlife record; DECC 2007e).

Identified Threats to Fauna Values:

High: Habitat loss, such as associated with new developments; habitat discontinuity within parts of the site; habitat loss in the adjoining Holsworthy Military Reserve; water quality, including leachate from the Glenfield Waste Disposal area; increased sedimentation; impacts of fire; weed infestation; housing encroachment on to remnant habitat; tree dieback; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); habitat disturbance by Rabbits; disturbance by uncontrolled domestic dogs; predation by wide-ranging domestic cats; erosion; bushrock removal; rubbish dumping; competition for hollows by feral Honeybees *Apis mellifera*.



Tree hollows are rare in many sections of the site, such as in this stand of Grey Box, Ingleburn Reserve. M. Schulz/DECC



Highly levels of weed infestation occur in some sections of the site, such as Leacock RP. M. Schulz/DECC



Biodiversity values are in part due to the proximity of extensive bushland in military areas. M. Schulz/DECC

Land Management:

The tenure of this site is complex. It includes Leacock RP managed by DECC and a number of reserves managed by Campbelltown City Council, including a section of Georges River NR, Simmo's Beach Recreation Reserve and Ingleburn Reserve. Other major land uses in the site include parts of Glenfield Waste Disposal area, Glenfield Sewerage Treatment Plant, in addition to sections of private land. There are a number of roads and easements bisecting the site, the latter managed by a variety of companies and government agencies. Immediately to the east of the Georges River the site is bordered by Department of Defence lands, including Holsworthy Military Reserve, Steele Barracks and Moorebank Military Reserve.

References and Further Reading:

Campbelltown City Council (2003, 2004), DEC (2005b, c, 2006), DECC (2007e), Keith (2004), Leary & Kwok (2007), Liverpool City Council (2003, 2007), NSW National Parks and Wildlife Service (2000a, 2001c, d), Urban Bushland Management Consultants (1997a, b).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – DEC (2006); +4 – G. Madani, DECC, pers. comm.; +5 – Leary & Kwok (2007); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 – only recorded prior to 1997 (Leary & Kwok 2007).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	+2	E1	
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Tyler's Tree Frog <i>Litoria tyleri</i>	+4	P	
Reptiles:			
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+5	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Birds:			
Black Swan <i>Cygnus atratus</i>	+3	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+3	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+3	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+3	P	
Cattle Egret <i>Ardea ibis</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+3	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	

Species	Status	Legal Status	Regional Status
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+2	P	RS
Australian Hobby <i>Falco longipennis</i>	+3	P	
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Purple Swampphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Common Greenshank <i>Tringa nebularia</i>	+3	P	RS
Black-fronted Dotterel <i>Elsayornis melanops</i>	+3	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+3	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+2	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Weebill <i>Smicronis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Scarlet Robin <i>Petroica boodang</i>	*1	P	RS
Rose Robin <i>Petroica rosea</i>	+3	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Restless Flycatcher <i>Myiagra inquieta</i>	+2	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+5	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	+5	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	+2	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	

Species	Status	Legal Status	Regional Status
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+2	U	
European Goldfinch <i>Carduelis carduelis</i>	+5	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+2	P	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+2	U	

Site 30: MYRTLE AND PETER MEADOWS CREEKS

Location:

Vegetated sections of Myrtle and Peter Meadows Creeks and western sections of the Georges River between the two creek confluences in the Minto Heights area (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Campbelltown

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	173	22
Commonwealth Land	1	<1
Remaining Public Land	0	0
Other (including Freehold held by Department of Planning)	599	77
Total	773	100

Environmental Setting:



Riparian vegetation along the Georges River downstream from Myrtle Creek. M. Schulz/DECC



Georges River corridor. M. Schulz/DECC



Grassy woodland above Peter Meadows Creek. M. Schulz/DECC

The site comprises vegetation along two major watercourses (Myrtle and Peter Meadows Creeks) and on the western side of the Georges River, immediately adjacent to Holsworthy Military Reserve. The landscape is dominated by vegetation communities associated with narrow incised valleys of Hawkesbury Sandstone along the Georges River and larger creek systems. The incised watercourses are backed by gently undulating crests, ridges and plateau surfaces of Mittagong formation and Wianamatta Group shales. Vegetation grades from those associated with Hawkesbury Sandstone slopes and gullies to open forests and grassy woodlands associated with the Wianamatta Shales on the mid to upper slopes. Watercourses vary from deeply incised gullies with pools and small cascades such as along Myrtle Creek to extensive sections of open water in a more open valley backed by low sandstone escarpments along the Georges River. This site is located on the western edge of a much larger protected area system that extends from Royal NP in the north and Budderoo and Morton NP in the south. The water quality of the river is poor after rain due to stormwater and septic runoff. The site supports two priority fauna habitats: grassy woodland and alluvial forest and woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	High

Fauna Overview: Important for sandstone transition forest fauna, combining a diverse array of species associated with grassy woodlands and Hawkesbury Sandstone vegetation communities; including species rare elsewhere within the CMA such as the threatened Swift Parrot, Black-chinned Honeyeater and Koala.



Swift Parrot; an endangered winter visitor to the site in some years. NPWS



Broad-tailed Gecko; a common species in overhangs and rock crevices in the site. N. Williams



A variety of bats occur in the site, such as the Chocolate Wattled Bat. M. Schulz

Priority Fauna Species Review:

There have been 130 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 87 birds, 24 reptiles, 17 mammals and two frogs. Of these one is considered endangered and four as vulnerable (discussed below). A further 23 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Swift Parrot	Endangered	2007 (Current study)	Freehold held by Department of Planning	Four individuals observed along Myrtle Creek downstream of Ashmead Road crossing in late Apr 2007 (Current study).
Powerful Owl	Vulnerable	2007 (Current study)	Freehold held by Department of Planning	One roosting individual encountered along the mid section of Myrtle Creek above Ashmead Road crossing in Apr 2007 (Current study). Likely to be several pairs ranging across the site
Black-chinned Honeyeater	Vulnerable	2007 (Current study)	Freehold held by Department of Planning	Two individuals observed in woodland upslope of Myrtle Creek upstream of Ashmead Road crossing and two individuals east of Hansens Road upslope of the Georges River in late Apr 2007 (Current study)
Koala	Vulnerable	2007 (Current study)	Widespread	Widespread, particularly along Myrtle Creek, with two individuals encountered in two localities adjacent to the creek in Apr 2007 (Current study; Atlas of NSW Wildlife records).
Southern Myotis	Vulnerable	2007 (Current study)	Crown: Georges River; Freehold held by Department of Planning	Recorded along the Georges River adjacent to Minto Bush Camp in March 1999 (Atlas of NSW Wildlife record). Likely to occur along all the larger streams within the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Habitat loss due to residential development; habitat loss in the adjoining Holsworthy Military Reserve; water quality; feral fish populations (particularly the Mosquitofish *Gambusia holbrooki*); fire frequency and intensity.

Moderate: Disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Fox, Feral Dog and Feral Cat); predation by uncontrolled domestic cats; impacts of Rabbit grazing; weed infestation; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping; housing encroachment on to fringing bushland areas.



Tree hollows are widely distributed across the site. M. Schulz/DECC



Dumped cars upslope of Myrtle Creek. M. Schulz/DECC



Rock overhangs are prevalent along Myrtle Creek. M. Schulz/DECC

Land Management:

This site is mostly freehold land held by the Department of Planning, with the exception of the Georges River and major creek systems that are managed by Sydney Water.

References and Further Reading:

Keith (2004), NSW National Parks and Wildlife Service (2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Reptiles:			
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Lace Monitor <i>Varanus varius</i>	+1	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Wedge-tailed Eagle <i>Aquila audax</i>	+1	P	RS
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Peaceful Dove <i>Geopelia striata</i>	+2	P	RS
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	+2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+1	P	RS
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	+1	E1	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Weebill <i>Smicronis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
Black-chinned Honeyeater <i>Melithreptus gularis</i>	+1	V	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+1	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	+1	P	RS
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+1	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Koala <i>Phascolarctos cinereus</i>	+1	V	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Feral Goat <i>Capra hircus</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+1	U	

Site 31: BOTANY BAY NATIONAL PARK (LA PEROUSE SECTION)

Location:

Vegetated parts of the La Perouse section of Botany Bay NP and adjacent bushland under various tenures on the north side of Botany Bay entrance (refer to Map iii).

Relative Area Size in CMA:

Small

Sub-catchment:

Eastern Beaches

Local Government Area:

Randwick

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	81	71
Crown Land	20	18
Commonwealth Land	0	0
Other Public Land	0	0
Other	13	11
Total	114	100

Environmental Setting:



Eastern Suburbs Banksia Scrub overlooking Botany Bay entrance. M. Schulz/DECC



Drainage line above Crowee Bay that may provide potential habitat for the Wallum Froglet. M. Schulz/DECC



The coastline at Cape Banks overlooking Botany Bay entrance. M. Schulz/DECC

The Botany Bay National Park (La Perouse section) incorporates remnant vegetation on the north side of Botany Bay entrance that is isolated from coastal vegetation to the north at Malabar Headland. The vegetation remnants include the largest example of Eastern Suburbs Banksia Scrub (an endangered ecological community) as well as other vegetation types associated with Hawkesbury Sandstone. The bushland sections of the site are currently separated by a band of manicured grass associated with the NSW Golf Course behind the eastern end of Crowee Bay. The shoreline primarily comprises cliffines with some intertidal reef platforms and small sandy beaches on the Botany Bay side. It is separated from Malabar Headland by a discontinuous band of vegetation above the rocky shoreline. The site supports two priority fauna habitats: heathland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

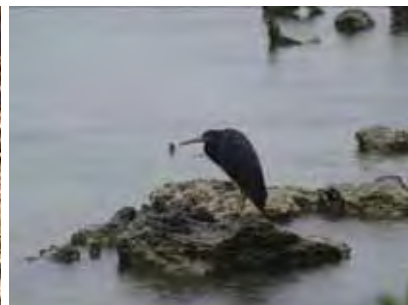
Fauna Overview: This site supports roosting colonies of the threatened Eastern Bentwing-bat, and a heathland fauna that was formerly widespread in the Eastern Suburbs, including some species that are uncommon in the CMA, such as the threatened Wallum Froglet and regionally significant species such as the Sheoak Skink, Lewin's Rail, Tawny-crowned Honeyeater and Short-beaked Echidna.



Henry Head gunnery emplacement; a site that supports an Eastern Bentwing-bat roost. M. Schulz/DECC



The Short-beaked Echidna has recently been reported in the area. M. Schulz



The Eastern Reef Egret is an occasional visitor to exposed reef platforms. M. Schulz

Priority Fauna Species Review:

There have been 136 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 101 birds, 15 reptiles, 14 mammals and six frogs. Of these five species are considered vulnerable (discussed below). A further 18 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Wallum Froglet	Vulnerable	1997 (Atlas record)	Crown: DECC	The only record is of a single individual at the wetland adjacent to Henry Hill (Atlas of NSW Wildlife record). None were recorded over two nights in Mar 2007 in the current study. However, during this period the Henry Head wetland was dry. Potential habitat also occurs in wet heathland on the edge of the shoreline between Henry Head and Cape Banks.
**Green and Golden Bell Frog	Endangered	1993 (Atlas record)	Crown: DECC	Recorded from a number of locations within the site, with the most recent record being of three individuals upslope of Congwong Bay in Oct 1993 (Atlas of NSW Wildlife record). Targeted surveys are required to determine whether this frog is still present.
Sooty Oystercatcher	Vulnerable	2007 (Current study)	Crown: DECC, DPI	Small numbers forage on exposed reef platforms, particularly between Cape Banks and Henry Head.
Powerful Owl	Vulnerable	1999 (Atlas record)	Crown: NSW Golf Course	Status uncertain. The only record is of a single individual in the adjacent NSW Golf Course (Atlas of NSW Wildlife record). No individuals responded to playback at two sites adjacent to the NSW Golf Course in Mar 2007 in the current study.
**Eastern Bristlebird	Endangered	1921 (Morris 1989)	Uncertain	Locally extinct. Last recorded in tall heath in the Little Bay area in 1921 (Morris 1989).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Large numbers from the seasonally occupied Kurnell camp forage on a variety of flowering plants in the area in the summer and autumn months, particularly targeting the Coast Banksia <i>Banksia integrifolia</i> .
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Foraging-widespread; Roosting: Crown: DECC	Regularly roost in the decommissioned gunnery emplacements on Henry Head and irregularly roost in smaller numbers in the emplacements at Cape Banks (White 2007). 30+ individuals were present in the former site and four in the latter site in Mar 2007 (Current

Species	Threat Category*	Last Recorded	Tenure	Comments
				study). There is currently a study underway investigating roost numbers and other aspects of this species' roosting ecology in the site (White 2007). This study has suggested there are movements of this species between the gunnery emplacements in this site and at Malabar Headland.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Two cave-dwelling bat roosts, tidal shoreline occasionally used by small numbers of migratory shorebirds. **Note:** A 'sizeable' colony of the Little Penguin formerly nested at Cape Banks until 1958 when the site ceased to be a military reserve with restricted public access (NSW National Parks and Wildlife Service 2000c).

Identified Threats to Fauna Values:

High: Further isolation of unconnected bushland remnants within the site; lack of habitat connectivity to other bushland remnants; potential adverse management activities on adjoining land, particularly the NSW Golf Course; fire frequency and extent; habitat degradation by informal walking tracks; weed infestation; disturbance to the Eastern Bentwing-bat roost due to uncontrolled public visitation; incorrect gating of gunnery tunnels that may cause the Eastern Bentwing-bat to abandon the site (see Thomson 2002; Gration 2006); damage as a result of an oil spill from the Caltex Oil Refinery loading facility at Kurnell; infection of frogs by amphibian chytrid causing the disease chytridiomycosis; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; habitat degradation by Rabbits; erosion; entanglement in discarded fishing tackle.



Discontinuous habitat within the site due to manicured landscapes associated with the NSW Golf Course. M. Schulz/DECC



Fauna impacts from maritime accidents are a real possibility along the shores of the site. M. Schulz/DECC



Poor habitat link between the site and Malabar Headland (in the distance). M. Schulz/DECC

Land Management:

The site primarily incorporates the La Perouse section of Botany Bay NP. Additionally adjacent land incorporated within the site includes a number of land owners and managers such as Telstra, the NSW Golf Course and DPI Fisheries (with respect to the adjoining Cape Banks Aquatic Reserve and intertidal areas).

References and Further Reading:

DEC (2005b), Gardner (2004), Gration (2006), Keith (2004), Morris (1989), NSW DPI Fisheries (2007b), NSW National Parks and Wildlife Service (2000c, 2001c, 2002a, d), Thomson (2002), White (2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – NSW National Parks and Wildlife Service (2002); +5 – Gardner (2004); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris 1989).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Wallum Froglet <i>Crinia tinnula</i>	+2	V	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	*1	E1	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Reptiles:			
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Sheoak Skink <i>Cyclodomorphus michaeli</i>	+2	P	RS
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Common Pheasant <i>Phasianus colchicus</i>	*1	U	
Australian Wood Duck <i>Chenonetta jubata</i>	+5	P	
Pacific Black Duck <i>Anas superciliosa</i>	+5	P	
Chestnut Teal <i>Anas castanea</i>	+5	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+5	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucus</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+2	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	*2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	+2	P	
Brown Falcon <i>Falco berigora</i>	+2	P	
Australian Hobby <i>Falco longipennis</i>	*2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	+1	P	RS
Lewin's Rail <i>Rallus pectoralis</i>	+3	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+5	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+5	P	
Latham's Snipe <i>Gallinago hardwickii</i>	*1	P	RS
Eastern Curlew <i>Numenius madagascariensis</i>	*2	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	*2	P	RS
Ruddy Turnstone <i>Arenaria interpres</i>	+3	P	RS
Red-necked Stint <i>Calidris ruficollis</i>	*1	P	RS
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	+1	V	
Pacific Golden Plover <i>Pluvialis fulva</i>	*1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Pacific Gull <i>Larus pacificus</i>	+3	P	
Kelp Gull <i>Larus dominicanus</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Common Tern <i>Sterna hirundo</i>	*2	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+5	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Southern Emu-wren <i>Stipiturus malachurus</i>	*2	P	Locally extinct?

Species	Status	Legal Status	Regional Status
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Eastern Bristlebird <i>Dasyornis brachypterus</i>	*2	E1	Extinct
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+3	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+3	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Tawny-crowned Honeyeater <i>Gliciphila melanops</i>	+2	P	RS
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
White-fronted Chat <i>Epthianura albifrons</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	*2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+5	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Pied Butcherbird <i>Cracticus nigrogularis</i>	+2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+1	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
European Goldfinch <i>Carduelis carduelis</i>	+5	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Tawny Grassbird <i>Megalurus timoriensis</i>	+5	P	RS

Species	Status	Legal Status	Regional Status
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+4	P	RS; Introduced?
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 32: ILLAWONG

Location:

Woronora River and fringing bushland/wetlands from the Georges River confluence to the Menai Road bridge, including Jannali Reserve, bushland in the Still Creek catchment and The Glen Bushland Reserve (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	262	54
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	219	46
Total	481	100

Environmental Setting:



Woodland on Hawkesbury Sandstone upslope of the Woronora River. M. Schulz/DECC



Woronora River downstream of Jannali Reserve. M. Schulz/DECC



Diverse habitat: mangroves, sedgeland and sandstone woodland, Still Creek area. M. Schulz/DECC

The site lies in the lower tidal reaches of the Woronora River upstream from the Georges River confluence. This section of the river has areas of seagrass (*Zosteraceae*), in addition to mudflats that are exposed at low tide. Where the vegetation has not been cleared, it is largely fringed by a variable width band of White Mangroves *Avicennia marina*, backed in some areas, such as Still Creek confluence by saltmarsh (an endangered ecological community) and intermittently flooded sedgeland. The distribution of these communities has changed over the past 70 years, with landward encroachment of mangroves into saltmarsh areas and seaward expansion of mangroves in response to sedimentation (WBM 2007). In low-lying areas adjacent to the river stands of the endangered ecological community, Swamp Oak *Casuarina glauca* forest occurs. The primary vegetation upslope of the river comprises woodland and gully vegetation associated with Hawkesbury Sandstone. There are plantings of a variety of non-indigenous plants in some local council reserves within the site, such as parts of Jannali Reserve. Overall water quality of the Woronora River is poorly known but after rain is of poor condition in some areas, such as adjacent to stormwater outlets due to the overflow of the sewerage system and stormwater runoff (WBM 2007). The site is situated immediately contiguous with the Lower Georges River site and by discontinuous vegetation upstream to the Woronora River site. The site supports four priority fauna habitats: forested wetland, alluvial forest and woodland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports a moderately diverse assemblage of estuarine and Hawkesbury Sandstone woodland fauna, including the threatened Powerful Owl and Osprey; and small numbers of migratory shorebirds including the Bar-tailed Godwit and Eastern Curlew.



The Peregrine Falcon roosts on the Menai Road bridge. M. Schulz



Small numbers of migratory shorebirds forage on mudflats at low tide, such as the Bar-tailed Godwit. M. Schulz



The Cream-striped Shinning Skink inhabits dead Swamp Oaks within the site. M. Schulz

Priority Fauna Species Review:

There have been 125 vertebrate fauna species (excluding fish and aviary escapees) documented within this area in the last 10 years: 97 birds, 11 reptiles, 11 mammals and six frogs. Of these four are considered vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further 14 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
**Rosenberg's Goanna	Vulnerable	1974 (Atlas record)	Uncertain	Observed in 1974 in the Still Creek area (Atlas of NSW Wildlife record). Current status uncertain.
Osprey	Vulnerable	2007 (Doyle 2007)	Crown	Observed along the Woronora River in the Como area in Apr 2007 (Doyle 2007). Likely to be an occasional visitor to the site (D. Andrew, DECC, pers. comm.).
Pied Oystercatcher	Vulnerable	2007 (Current study)	Crown	Regularly observed foraging on exposed tidal flats at the mouth of the Woronora River (Current study; D. Andrew, DECC, pers. comm.).
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown	Regularly used as a foraging site by small number (<50) of individuals from this community, particularly the Eastern Curlew and Bar-tailed Godwit (D. Andrew, DECC, pers. comm.). These birds primarily feed on the intertidal mudflats along the lower reaches of the Woronora River, particularly on mudflats at confluence with the Georges River, around Mangrove Island, Bonnet Bay area and on flats at Illawong and Lugarno.
Powerful Owl	Vulnerable	2007 (Current study)	Crown; Sutherland Shire Council	One observed roosting along the south branch of Still Creek in May 2007 (Current study). Also has been heard calling in 2007 at The Glen Reserve, Bonnet Bay (M. Rudic-Pera, local resident, pers. comm.) and adjacent to Bottle & Glass Head, Illawong in Apr 2007 (Current study). Likely to be one or possibly two pairs present within the site.
**Koala	Vulnerable	1993 (Atlas record)	Uncertain	The last record from the area is of one individual in Mar 1993 south of Still Creek (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	This species forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points NSW Scientific Committee (1998).

Additional Faunal Values: Regularly used as a foraging site by small numbers of the migratory shorebirds.

Identified Threats to Fauna Values:

High: Discontinuous habitat links with remnant vegetation in upstream sections of the Woronora River, such as Heathcote NP; reclamation of wetland habitat; habitat discontinuity within the site, particularly in the Como area where there is no fringing vegetation along the river due to houses built down to the river edge; fire frequency and extent; water quality; increased sedimentation and associated dredging, particular at the Georges River confluence; disturbance to wildlife and bank erosion by watercraft and widespread access along the banks of the river; potential bird strike from overhead powerlines crossing the Woronora River; mangrove encroachment on to intertidal flats and saltmarsh.

Moderate: Habitat degradation by trail bikes and off-road vehicles; predation by domestic cats; disturbance by uncontrolled domestic dogs; weed infestation; predation by feral predators (such as the Fox and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping.



Powerlines crossing the Woronora River may result in bird strike. M. Schulz/DECC



Degraded saltmarsh, adjacent to Still Creek. M. Schulz/DECC



Continuous vegetation along the Woronora River broken by houses coming to the waterline, Como. M. Schulz/DECC

Land Management:

The site primarily comprises crown land and areas managed by Sutherland Shire Council, such as Jannali and The Glen Bushland Reserves. Private land occurs mostly in small parcels of land fringing the site, particularly in the Still Creek catchment. There are a number of easements bisecting the site managed by a variety of companies and government agencies. The Woronora River including its estuarine vegetation is Crown Land. Any work within this area with respect to migratory shorebirds will require a cooperative approach to managing the site, in conjunction with other migratory shorebird/waterbird sites in the Botany Bay/lower Georges River area such as those used by Endangered Ecological Shorebird community occurring on the relict tidal delta sands of Botany Bay. Management is perhaps best served by the development of an overall plan of management.

References and Further Reading:

Australian Water Technologies (1999), Doyle (2007), Keith (2004), NSW National Parks and Wildlife Service (2001d), NSW Scientific Committee (1998), WBM (2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – D. Andrew, DECC, unpublished records; * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Haswell's Froglet <i>Paracrinia haswelli</i>	+2	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Rosenberg's Goanna <i>Varanus rosenbergi</i>	*	V	
Lace Monitor <i>Varanus varius</i>	*	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	*	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Green Tree Snake <i>Dendrelaphis punctulata</i>	*	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+4	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	+4	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+1	P	
Osprey <i>Pandion haliaetus</i>	+3	V	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+4	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Eurasian Coot <i>Fulica atra</i>	+1	P	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Whimbrel <i>Numenius phaeopus</i>	+4	P	RS

Species	Status	Legal Status	Regional Status
Eastern Curlew <i>Numenius madagascariensis</i>	+1	P	RS
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	+4	P	RS
Pied Oystercatcher <i>Haematopus longirostris</i>	+4	V	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Rock Dove <i>Columba livia</i>	+2	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+4	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+4	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+4	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+4	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+4	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+4	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+4	P	
Bell Miner <i>Manorina melanophrys</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+4	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+1	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+4	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silveryeye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Koala <i>Phascolarctos cinereus</i>	*	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	

Site 33: NORTH HEAD

Location:

North Head, including the North Head section of Sydney Harbour NP (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Middle Harbour

Local Government Area:

Manly

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	181	75
Crown Land	59	25
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	22	9
Total	262	100

Environmental Setting:



Looking south along the rugged North Head cliffs to a clipper negotiating the narrow opening of Sydney Heads. M Schulz/DECC



Little Penguin critical nesting habitat, Collins Bay area. M. Schulz/DECC



Wet heathland on North Head looking across to South Head and the city. M. Schulz/DECC

This site comprises the spectacular northern side of the entrance of Sydney Harbour, which is surrounded on three sides by ocean and harbour waters. North Head is a relatively flat prominence on Hawkesbury Sandstone, with dramatic cliff faces on its eastern and southern sides, and moderate to steep slopes on its northern and western flanks. It supports some of the most extensive areas of little to moderately disturbed vegetation fringing Sydney Harbour, due to the long-term tenure and activities of various Government organisations. It contains important historic places in the development of Sydney, such as the Quarantine Station which is the oldest, largest and most intact human quarantine facility in Australia. Current land uses on the site aside from Sydney Harbour NP, include North Head Water Pollution Control Plant and the associated Northside Storage Tunnel, the Australian Institute of Police Management and the School of Artillery. Vegetation communities present consists of wet and dry heath; coastal scrub dominated by Coast Tea-tree *Leptospermum laevigatum*, Scrub She-oak *Allocasuarina distyla*, Heath Banksia *Banksia ericifolia* and the mallee form of the Heart-leaved Stringybark *Eucalyptus camfieldii*; Eastern Suburbs Banksia Scrub (an endangered ecological community) and woodland vegetation communities characteristic of low nutrient Hawkesbury Sandstone. Patches of closed forest occur behind Collins Beach and upslope of Quarantine Beach. Substantial areas of vegetation have a high level of weed infestation and sections suffer from tree dieback, some of which is associated with Root-rot Fungus *Phytophthora cinnamomi*. The area is heavily frequented by people both via a network of walking tracks and from the sea. The site not directly linked by continuous vegetation to other larger bushland remnants within the local area. It supports two priority fauna habitats: rainforest and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: This site supports a fauna typical of the headlands fringing undeveloped sections of the northern shoreline of Sydney Harbour; in addition to supporting endangered populations of the Long-nosed Bandicoot and Little Penguin.



The Little Penguin nesting along parts of the shoreline has been listed as an endangered population. M. Schulz



The Long-nosed Bandicoot on North Head has been listed as an endangered population. N. Williams



A number of reptile species occur on North Head, such as the regionally significant Southern Scaly-foot. N. Williams

Priority Fauna Species Review:

There have been 152 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 103 birds, 24 reptiles, 19 mammals and six frogs. Of these two are considered endangered populations and four as vulnerable species (discussed below). A further 26 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red -crowned Toadlet	Vulnerable	2007 (Atlas record)	Crown: DECC	Status uncertain. One documented record adjacent to the DECC headquarters in Mar 1997 (Atlas of NSW Wildlife records).
Little Penguin	Endangered Population	2007 (Current study)	Crown: DECC	Part of this endangered population nests within the site in the Spring Cove area south to Cannae Point (NSW National Parks and Wildlife Service 2000c, 2002e). The remainder breed in the Little Manly Cove and Little Manly Point areas (NSW National Parks and Wildlife Service 2000c, 2002e). A range of nest sites are utilised including under the rocks on the foreshore, rock falls under seaside houses, garages, under stairs, in woodpiles and under overhanging vegetation (NSW National Parks and Wildlife Service 2000c). This population is one of the only mainland breeding sites in NSW, with an overall population estimated at 75 breeding pairs in 2001/02 (NSW National Parks and Wildlife Service 2002e). Regularly seen and heard close inshore around the site.
Powerful Owl	Vulnerable	2000 (Atlas record)	Crown: DECC	Status uncertain. A single record from the Quarantine Station in Jan 2000 (Atlas of NSW Wildlife record).
Long-nosed Bandicoot	Endangered Population	2007 (Sydney Harbour NP records)	Widespread	A small isolated population is present on North Head in a variety of habitats, although preferring more open vegetation than dense heathland (Puddephatt & Miller 1996). Monitoring results between Oct 1997 and May 2001 indicate the population has remained relatively stable and that numbers fluctuate between the peak breeding and non-breeding periods (Gunninah Environmental Consultants 2001).
**Eastern Pygmy-possum	Vulnerable	1987 (Gunninah Environmental Consultants 2001)	Uncertain	Status uncertain. One old record that requires confirmation (Gunninah Environmental Consultants 2001; T. Leary, DECC, pers. comm.).

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2004 (Atlas record)	Widespread	Forages in the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2004 (Atlas record)	Widespread	Only recorded in May 2004 from the western side of North Head. Likely to forage widely across the site. No known roosts, although it is likely to shelter in tunnels associated with decommissioned gun emplacements and other military installations on the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Supports a component of the only nesting site of the Little Penguin in the CMA area.

Identified Threats to Fauna Values:

High: Loss and degradation of habitat; habitat fragmentation within the site; disturbance to nesting Little Penguins, including when rafting in inshore waters prior to coming ashore on dusk; lack of direct habitat connectivity to other bushland remnants; weed infestation; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat), particularly of the two endangered populations; road mortality, particularly involving the endangered population of the Long-nosed Bandicoot; water quality from stormwater runoff, sewage overflows and atmospheric fallout, including impacting on the Little Penguin population; commercial fishing resulting in loss of Little Penguin prey species; loss of kelp and seagrass beds offshore from Store and Quarantine Beaches as a result of anchor damage affecting Little Penguin prey species; altered fire regime.

Moderate: Disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Black Rat, Brown Rat, Fox, Feral Dog and Feral Cat); erosion; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle.



Nesting Little Penguins face a number of threats as they nest on the mainland within an urban setting. M. Schulz/DECC



Road signs have been erected to reduce the number of Long-nosed Bandicoots hit by cars. M. Schulz/DECC



Remnant bushland on North Head faces a number of threats such as tree dieback and weed infestation. M. Schulz/DECC

Land Management:

The site is primarily managed by DECC as part of Sydney Harbour NP. Other Crown lands within the site include North Head Water Pollution Control Plant managed by Sydney Water, the School of Artillery land managed by the Sydney Harbour Trust, the grounds of the Australian Institute of Police Management and remnant bushland within Manly District Hospital grounds. Private land includes remnant bushland on the southeastern edge of St Pauls College.

References and Further Reading:

Ecotone Ecological Consultants (1995, 1998), GIS Environmental Consultants (2003), Gunninah Environmental Consultants (1998, 2001), Horton (1986), Keith (2004), Morris (1986), NSW National Parks and Wildlife Service (2000c, 2002c, d, e), Puddephatt & Miller (1996), Scott *et al.* (1999), Skelton (2001), Skelton *et al.* (2003), Sydney Harbour Federation Trust (2004), Wilson (1999).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – Skelton *et al.* (2003); +5 – GIS Environmental Consultants (2003); +6 – Skelton (2001); +7 – Ecotone Ecological Consultants (1998); +8 – H.

Cook (Birds Australia, pers. comm.); +9 – H. Cook, pers. comm.; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris 1986); *3 – only recorded prior to 1997 (GIS Environmental Consultants 2003); *4 – only recorded prior to 1997 (Horton 1986); *5 – only recorded prior to 1997 (Ecotone Ecological Consultants 1995).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); EP – Endangered Population (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+5	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+8	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Freycinet's Frog <i>Litoria freycineti</i>	+5	P	RS
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Reptiles:			
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+2	P	RS
Burton's Legless-lizard <i>Lialis burtonis</i>	+5	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+2	P	RS
Lace Monitor <i>Varanus varius</i>	+6	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+5	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+2	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+2	P	
White's Rock-skink <i>Egernia whitii</i>	+7	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+4	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+4	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+7	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	*4	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	+4	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+2	P	
Marsh Snake <i>Hemiaspis signata</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+2	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Red Junglefowl <i>Gallus gallus</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+9	P	
Little Penguin <i>Eudyptula minor</i>	+2	EP	Nesting colony
Darter <i>Anhinga melanogaster</i>	+9	P	

Species	Status	Legal Status	Regional Status
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+9	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+9	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Eastern Reef Egret <i>Egretta sacra</i>	+9	P	RS
White-necked Heron <i>Ardea pacifica</i>	+9	P	
Australian White Ibis <i>Threskiornis molucca</i>	+9	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+9	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+3	P	RS
Spotted Harrier <i>Circus assimilis</i>	+3	P	
Swamp Harrier <i>Circus approximans</i>	*1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Little Eagle <i>Hieraaetus morphnoides</i>	+9	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Lewin's Rail <i>Rallus pectoralis</i>	+9	P	RS
Painted Button-quail <i>Turnix varia</i>	+3	P	RS
Masked Lapwing <i>Vanellus miles</i>	+2	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	*1	P	
White-fronted Tern <i>Sterna striata</i>	+3	P	
Common Tern <i>Sterna hirundo</i>	+3	P	RS
Rock Dove <i>Columba livia</i>	+2	U	
White-headed Pigeon <i>Columba leucomela</i>	+9	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+2	U	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	+9	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+9	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+2	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+9	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basal</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites basal</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+9	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+9	P	
Pheasant Coucal <i>Centropus phasianinus</i>	+9	P	RS
Powerful Owl <i>Ninox strenua</i>	+2	V	

Species	Status	Legal Status	Regional Status
Southern Boobook <i>Ninox boobook</i>	+2	P	
Barn Owl <i>Tyto alba</i>	+2	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+9	P	
Dollarbird <i>Eurystomus orientalis</i>	+9	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+9	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+6	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+9	P	
Rockwarbler <i>Origma solitaria</i>	+9	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+9	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+9	P	
Striated Thornbill <i>Acanthiza lineata</i>	+9	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+2	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+9	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+9	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+9	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+9	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+9	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+2	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+9	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+9	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+9	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+2	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+9	P	

Species	Status	Legal Status	Regional Status
Welcome Swallow <i>Hirundo neoxena</i>	+2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+2	U	
Golden-headed Cisticola <i>Cisticola exilis</i>	+9	P	RS
Silvereye <i>Zosterops lateralis</i>	+2	P	
Common Starling <i>Sturnus vulgaris</i>	+2	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	EP	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Eastern Pygmy-possum <i>Cercartetus nanus</i>	*3	V	Unconfirmed
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	*3	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
Freetail-bat <i>Mormopterus</i> sp	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+4	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Water-rat <i>Hydromys chrysogaster</i>	+2	P	RS
House Mouse <i>Mus musculus</i>	+2	U	
Brown Rat <i>Rattus norvegicus</i>	+2	U	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	
Brown Hare <i>Lepus capensis</i>	+4	U	

Site 34: DARLING MILLS CREEK – CUMBERLAND STATE FOREST – LAKE PARRAMATTA

Location:

This site comprises two disconnected but closely situated sections: a) Darling Mills Creek from North Rocks upstream to Excelsior and Bidjigal Reserves and along a small creekline through Richard Webb Reserve to Cumberland State Forest in the suburbs of Castle Hill, Northmead, North Rocks and West Pennant Hills; and b) Lake Parramatta Reserve and adjacent bushland along Hunts Creek in North Parramatta, North Rocks and Carlingford (refer to Map iii).

Relative Area Size in CMA:

Medium

Sub-catchment:

Parramatta River

Local Government Area:

Baulkham Hills and Parramatta

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	195	35
Commonwealth Land	0	0
Remaining Public Land	36	7
Other	325	58
Total	556	100

Environmental Setting:



Lake Parramatta fringed by high quality remnant forest. M. Schulz/DECC



Remnant Blue Gum High Forest adjacent to Richard Webb Reserve. M. Schulz/DECC



Blackbutt forest, Lake Parramatta. M. Schulz/DECC

A very irregularly shaped site situated in the headwaters of the Parramatta River within a highly urbanised environment on the north-west edge of the CMA. The site comprises two sections that are isolated by several hundred metres of residential land along North Rocks Road between The Carriageway and William Place in North Parramatta and North Rocks. In sections of the site, remnant vegetation is <100m wide with some of this band being impacted by encroachment from adjacent houses. A narrower more tenuous remnant vegetation band links Cumberland SF with Darling Mills Creek. The only open waterbody in the site is Lake Parramatta situated in the Hunts Creek catchment. This lake was established in 1855 as freshwater source and today is a popular recreation area. The site is characterised by remnant vegetation largely restricted to incised gullies and slopes of Hawkesbury Sandstone with scattered rock outcrops giving way in the headwaters to less deeply incised watercourses and undulating terrain on Wianamatta Group shales. In much of the site, except for some of the larger reserves such as Cumberland SF and Lake Parramatta Reserve housing development occurs on most less steeply inclined terrain either immediately abutting watercourses (or even over creeklines in places) or on the edge of incised gullies. Vegetation is dominated by Hawkesbury Sandstone communities in the southern parts of the site. Well developed gully forest dominated by Blackbutt *Eucalyptus pilularis* and stands of Sydney Blue Gum *E. saligna* occur along gullies and creeklines in much of the site with some sections of closed shrub layer dominated by wet forest species such as Blueberry Ash *Elaeocarpus reticulatus*, Black Wattle *Callicoma serratifolia*, Sweet Pittosporum *Pittosporum undulatum*, Water Gum *Tristaniopsis laurina* and a few Coachwood *Ceratopetalum apetalum*. In some sections patches of Sydney Turpentine *Syncarpia glomulifera*-Ironbark Forest (an endangered ecological community) occurs on the slopes, such as in the Castle Hill–West Pennant Hills area and around Lake Parramatta. Remnant patches of the endangered ecological community Blue Gum High Forest characterised by

Sydney Blue Gum and Blackbutt occurs in the higher elevation areas such as in parts of Cumberland SF and around Richard Webb Reserve on shale covered ridges and slopes. Much of the area has been extensively logged in the past resulting in relatively few well developed hollows being present in regenerating forests. Watercourses are subject to poor water quality as a result of stormwater runoff. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of areas of weed infestation, such as *Lantana camara*, Camphor Laurel *Cinnamomum camphora* and Privet *Ligustrum* species. Sections of the site have high levels of public visitation with a network of formal walking tracks established, such as Cumberland SF, Bidjigal Reserve and Lake Parramatta Reserve. It is not directly linked by continuous vegetation to other conservation reserves within the area. The site supports three priority fauna habitats: rainforest, alluvial forest and woodland and grassy woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Little	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: A diverse array of fauna typical of Hawkesbury Sandstone and Wianamatta Group Shale vegetation communities, including the threatened Powerful Owl, Eastern Bentwing-bat and Greater Broad-nosed Bat; and it is one of the only sites in the CMA where the White-bellied Cuckoo-shrike is regularly recorded.



There is a high density of arboreal mammals in the site, such as the Common Brushtail Possum. M. Schulz/DECC



The Eastern Water Dragon is a prominent feature of Lake Parramatta. M. Schulz/DECC



A variety of parrots such as the Rainbow Lorikeet are common within the site. M. Schulz

Priority Fauna Species Review:

There have been 184 vertebrate fauna species (excluding fish, vagrants and escapees) documented within this area in the last 10 years: 132 birds, 24 mammals, 20 reptiles and eight frogs. Of these seven species (excluding vagrants and unconfirmed species) are considered vulnerable (discussed below). A further 25 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Comb-crested Jacana (VAGRANT)	Vulnerable	2002 (Parramatta City Council 2003)	Crown Reserve: Lake Parramatta Reserve	Vagrant. This species is a rare and sporadic visitor to the Sydney region, principally to wetlands associated with the Hawkesbury River (Hoskin <i>et al.</i> 1991). Recorded from Lake Parramatta in 2002 (Parramatta City Council 2003).
**Swift Parrot	Endangered	1983 (AES Environmental Consultancy)	Crown: DPI (Forestry); Baulkham Hills Shire Council	No recent documented records. One record from the end of Hepburn Road, Bidjigal Reserve (Atlas of NSW Wildlife record) and from Excelsior Reserve in 1983 (AES Environmental Consultancy 2003).
Powerful Owl	Vulnerable	2007 (Current study)	Widespread, including Crown	At least two resident pairs in the site; in Excelsior and Bidjigal Reserves and

Species	Threat Category*	Last Recorded	Tenure	Comments
			Reserve, DPI (Forestry), private	Cumberland SF (Atlas of NSW Wildlife records). Also recorded from Lake Parramatta Reserve in Oct 2007 (Current study). Nesting has been recorded along Darling Mills Creek near North Rocks and in Cumberland SF (Kavanagh 2004).
Masked Owl	Vulnerable	2002 (Atlas record)	Crown: DPI (Forestry); private	Status uncertain. A single bird was recorded in May 2002 on the edge of Cumberland SF (Atlas of NSW Wildlife record). There are also a number of older records from the West Pennant Hills/Pennant Hills area (Morris 2007a).
Koala	Vulnerable	2002 (Graham 2002)	Crown: DPI (Forestry)	Status uncertain. The only documented record was of one individual seen in Cumberland SF in July 2002 (Graham 2002).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Likely to forage widely across the site when suitable trees and shrubs are in flower or fruit. There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Yellow-bellied Sheath-tail-bat (VAGRANT)	Vulnerable	Uncertain (B. Law DPI (Forestry) pers. comm.)	Crown: DPI (Forestry)	Status uncertain. Recorded by the identification of ultrasonic signals using Anabat detectors at Cumberland SF (Basham 2005; B. Law, DPI (Forestry) pers. comm.). This species is regarded as a vagrant to the CMA (DECC 2007b; H. Parnaby, DECC, pers. comm.).
East-coast Freetail-bat	Vulnerable	2002 (Parramatta City Council 2003)	Crown Reserve: Lake Parramatta Reserve	Status uncertain. Recorded from Lake Parramatta Reserve (Parramatta City Council 2003) and Cumberland SF (Basham 2005; B. Law, DPI (Forestry) pers. comm.). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	2002 (Atlas record)	Crown: DPI (Forestry); private	Recorded from the Cumberland SF area and Excelsior Park (AES Environmental Consultancy 2003; Atlas of NSW Wildlife record; B. Law, DPI (Forestry) pers. comm.). There are no documented roosts within the site.
Greater Broad-nosed Bat	Vulnerable	2002 (Atlas record)	Crown Reserve: Lake Parramatta Reserve	Status uncertain. Recorded by the identification of ultrasonic signals using Anabat from Lake Parramatta Reserve in Mar 2001 (Atlas of NSW Wildlife record).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Habitat continuity within the site, particularly between Lake Parramatta and Darling Mills Creek and Cumberland SF and Bidjigal Reserve; no direct habitat link with other conservation reserves within the local region; high edge effect particularly from housing encroachment on to fringing bushland areas; water quality, particularly stormwater run off; weed infestation; tree dieback; loss of hollow-bearing trees; impacts associated with roads crossing the site.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; fire frequency and intensity; competition for hollows by feral Honeybees *Apis mellifera*; bush rock removal; impacts associated with high public visitation in parts of the site, such as erosion.



The site is bisected by a number of busy roads. M. Schulz/DECC



Due to the narrow nature of much of the site housing encroachment on to remnant bushland is a major problem. Schulz/DECC



Tree dieback occurs in patches within the site, such as around parts of Lake Parramatta. M. Schulz/DECC

Land Management:

The tenure of this site is complex. It includes land managed by DPI Forestry at Cumberland SF, crown reserve managed by Baulkham Hills Shire Council and Parramatta City Council including Bidjigal, Excelsior, Lake Parramatta and Richard Webb Reserves; and private land including bushland on parts of The Kings School. The site is comprised of two isolated sections separated by residential land in the North Rocks Road area. Strategic management is required to ensure continuity of habitat between Cumberland SF and Darling Mills Creek valley to maintain maximum biodiversity within the site. The creation of a habitat link between this site and the Berowra Valley Bushland Park in the Hornsby LGA within the Hawkesbury-Nepean CMA would further ensure the maintenance of biodiversity values within the site.

References and Further Reading:

AES Environmental Consultancy (2003), Basham (2005), Benson & Howell (1995), DECC (2007b), Fairley & Waterhouse (2005), Graham (2002), Hoskin *et al.* (1991), Kavanagh (2004), Keith (2004), Morris (2007a), Mt King Ecological Surveys (2001), Parramatta City Council (2003), Roberts (1993), Upper Parramatta River Catchment Trust (1999, 2002).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website & Birdline NSW; +4 – Fairley & Waterhouse (2005); +5 – Parramatta City Council (2003); +6 – Baulkham Hills Shire Council fauna records; +7 – AES Environmental Consultancy (2003); +8 – (Basham 2005; B. Law (DPI (Forestry), pers. comm.); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Ranger staff, Cumberland SF); *3 – only recorded prior to 1997 (Mt King Ecological Surveys 1992).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	*3	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+4	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	*3	P	RS
Green Tree Frog <i>Litoria caerulea</i>	+2	P	RS
Keferstein's Tree Frog <i>Litoria dentata</i>	+2	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+2	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Burton's Legless-lizard <i>Lialis burtonis</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	*1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Lace Monitor <i>Varanus varius</i>	+5	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+5	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+3	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+4	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+6	P	
Green Tree Snake <i>Dendrelaphis punctulata</i>	+6	P	RS
Golden-crowned Snake <i>Cacophis squamulosus</i>	*1	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	*3	P	
Marsh Snake <i>Hemiaspis signata</i>	*3	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+2	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	*1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+3	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Purple Swamphen <i>Porphyrio porphyrio</i>	+2	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Black-tailed Native-hen <i>Gallinula ventralis</i>	+5	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+2	P	RS
Comb-crested jacana <i>Irediparra gallinacea</i>	+5	V	
Black-fronted Dotterel <i>Elsayornis melanops</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Common Bronzewing <i>Phaps chalcoptera</i>	+1	P	RS
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+7	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+4	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+2	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Swift Parrot <i>Lathamus discolor</i>	*1	E1	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+2	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+2	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	+3	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalus</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamis orientalis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+3	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+2	P	
Masked Owl <i>Tyto novaehollandiae</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Nightjar <i>Eurostopodus mystacalis</i>	+3	P	RS
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Azure Kingfisher <i>Alcedo azurea</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+3	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+2	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+2	P	

Species	Status	Legal Status	Regional Status
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+2	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+2	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+2	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+5	P	
Bell Miner <i>Manorina melanophrys</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+2	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+2	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+2	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+2	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+4	P	
Flame Robin <i>Petroica phoenicea</i>	+2	P	RS
Rose Robin <i>Petroica rosea</i>	+3	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Spotted Quail-thrush <i>Cinclosoma punctatum</i>	+2	P	RS
Varied Sittella <i>Daphoenositta chrysoptera</i>	+3	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+2	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+2	P	
Spectacled Monarch <i>Monarcha trivirgatus</i>	*1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+3	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	*3	P	
Restless Flycatcher <i>Myiagra inquieta</i>	*1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	+3	P	RS
Cicadabird <i>Coracina tenuirostris</i>	+4	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	*1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+2	P	
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+2	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+2	U	
European Greenfinch <i>Carduelis chloris</i>	+2	U	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+2	P	
Fairy Martin <i>Petrochelidon ariel</i>	+7	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	+4	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+6	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+3	V	Escapee?
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+6	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>	+8	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+5	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturinus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+8	P	RS
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	*3	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+2	U	

Species	Status	Legal Status	Regional Status
Bush Rat <i>Rattus fuscipes</i>	*3	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	*3	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 35: DUCK RIVER AND UPPER PARRAMATTA RIVER

Location:

Duck River and fringing vegetation from the Parramatta River confluence upstream to Norfolk Park, South Granville and the Upper Parramatta River and adjoining fringing vegetation from Silverwater upstream to Parramatta Park and Cumberland Hospital (refer to Map iii).

Relative Area Size in CMA:

Small

Sub-catchment:

Parramatta River

Local Government Area:

Parramatta and Auburn

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	9	5
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	173	95
Total	182	100

Environmental Setting:



Grassy woodland, Duck River Reserve. M. Schulz/DECC



Green and Golden Bell Frog habitat, Clyde Wetland. M. Schulz/DECC



Confluence of Duck and Parramatta Rivers. M. Schulz/DECC

The site comprises Duck River and the Parramatta River upstream from Silverwater including both tidal and non-tidal sections. The tidal sections of the two rivers are predominantly fringed by a varying width band of mangroves with some intertidal mudflats exposed at low tide in the Silverwater area. Behind the mangrove band there is little natural vegetation remaining; rather the rivers are backed by parklands or industrial and residential areas. The Clyde Wetlands situated adjacent to the Parramatta River in the Clyde Shell Refinery is an extensively modified freshwater wetland with sections of Swamp Oak *Casuarina glauca* floodplain forest (both recognised as endangered ecological communities). It was formerly an ephemeral open brackish lagoon with low mangroves and extensive salt flats (Urban Bushland Management Consultants 2007). The non-tidal section of Duck River is generally heavily weed infested with little natural vegetation remaining, except in the Duck River Reserve and sections of Auburn Botanic Gardens that includes high quality remnants of Cumberland Plain woodland. The flood prone flats of lower Duck River have been the site of past landfill activities and now are used as playing fields and for industrial activities. Similarly the non-tidal sections of Parramatta River are highly modified and discontinuous, particularly through Parramatta; with small remnants of alluvial forest and woodland present in Parramatta Park. The site supports five priority fauna habitats: forested wetland, alluvial forest and woodland, grassy woodland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Highly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports two Grey-headed Flying-fox camps and a wetland that has a population of the endangered Green and Golden Bell Frog. Otherwise fauna present is typical of a highly modified environment within an urban/industrial setting.



Duck River Grey-headed Flying-fox camp. M. Schulz/DECC



Parramatta River Grey-headed Flying-fox camp. M. Schulz/DECC



Bridges over the two rivers support breeding populations of the feral Rock Dove. M. Schulz/DECC

Priority Fauna Species Review:

There have been 116 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 88 birds, 11 reptiles, 11 mammals and six frogs. Of these one is considered endangered and one vulnerable species occurs (these are discussed below). A further 14 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Green and Golden Bell Frog	Endangered	2007 (Urban Bushland Management Consultants 2007)	Private: Shell Clyde Refinery	A population of this species occurs in the Clyde Wetlands, with breeding habitat occurring in the small ponds on the southern side of the Wetlands (Urban Bushland Management Consultants 2007). Individuals may also range into grassland on adjoining industrial land.
**Regent Honeyeater	Endangered	1949 (Regent Honeyeater Recovery program database, DECC)	Parramatta Council	Recorded from Parramatta Park in Nov 1949 (Regent Honeyeater Recovery program database, DECC). May occur as an extremely rare visitor.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat; two camps: Parramatta colony: Parramatta Council, Sydney Water, private and Cumberland Hospital; Duck River: Sydney Water	Forages widely across the site when suitable trees and shrubs are in flower or fruit. Two known camps in the site located some 4km apart: 1. Edge of the Parramatta River in Parramatta Park and adjoining sections of Cumberland Hospital. For 2007 a maximum estimate of 10391 individuals occupied the camp in July (A. Smith, University of Technology, Sydney, pers. comm.). 2. Duck River south of the railway bridge adjacent to the Clyde Marshalling Yards. This camp is primarily located in Willows <i>Salix</i> sp. For 2007, a maximum estimate of 10529 individuals occupied the camp in June (A. Smith, University of Technology, Sydney, pers. comm.).

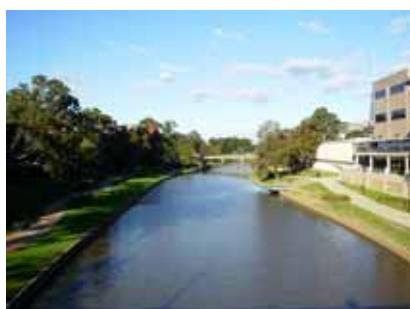
* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Two large Grey-headed Flying-fox camps (Parramatta Park and Duck River); tidal shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Limited habitat link with Newington Nature Reserve downstream on the Parramatta River and Darling Mills Creek and Lake Parramatta Reserve in the headwaters of the Parramatta River; habitat fragmentation within the site thereby restricting fauna movements, particularly in the vicinity of Parramatta; clearing of Willows which may threaten the Grey-headed Flying-fox camp sites currently used; management of the Clyde Wetlands not taking in to account the requirements of the endangered Green and Golden Bell Frog; housing and industrial encroachment on to remnant habitat; water quality, particularly stormwater and industrial run off; siltation; weed infestation; foreshore changes as a result of wake impacts of large vessels on the Parramatta River; feral fish populations (particularly the Mosquitofish *Gambusia holbrooki*) in the Clyde Wetlands; infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Disturbance at flying-fox camps; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; impacts associated with easements.



Discontinuous habitat band along the Parramatta River, Parramatta. M. Schulz/DECC



Willow removal may threaten the Grey-headed Flying-fox camps within the site. M. Schulz/DECC



A number of major roads cross the site, such as the M4 Motorway. M. Schulz/DECC

Land Management:

Remnant vegetation fringing Duck and Parramatta Rivers is managed by a variety of landholders and management agencies, including Auburn and Parramatta City Councils, Cumberland Hospital, the Department of Planning and various private landholders. There are a number of easements bisecting the site managed by a variety of companies and government agencies, such as Shell Clyde Refinery, RTA and RailCorp.

References and Further Reading:

DEC (2005b), Gunninah Environmental Consultants (1990), Hamer *et al.* (2002), Keith (2004), NSW National Parks and Wildlife Service (2001c), Parramatta City Council (2003), Pyke & White (2001), Urban Bushland Management Consultants (2005, 2007).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Urban Bushland Management Consultants (2005, 2007); +5 – Friends of Duck River; +6 – Parramatta City Council (2003); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 - only recorded prior to 1997 (Regent Honeyeater Recovery Program database, DECC).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Smooth Toadlet <i>Uperoleia laevigata</i>	+4	P	RS
Green and Golden Bell Frog <i>Litoria aurea</i>	+4	E1	
Peron's Tree Frog <i>Litoria peronii</i>	+4	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+4	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+5	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+6	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+4	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+6	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+6	P	RS
Black Swan <i>Cygnus atratus</i>	+1	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+4	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	+6	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+6	P	RS
Whistling Kite <i>Haliastur sphenurus</i>	+3	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+1	P	RS
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS

Species	Status	Legal Status	Regional Status
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Common Sandpiper <i>Actitis hypoleucos</i>	*1	P	RS
Black-winged Stilt <i>Himantopus himantopus</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Pacific Koel <i>Eudynamis orientalis</i>	+4	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+6	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+6	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*2	E1	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+4	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+3	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Australasian Figbird <i>Sphecotheres vieilloti</i>	+3	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Hirundo ariel</i>	+4	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+4	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Horseshoe-bat <i>Rhinolophus megaphyllus</i>	+4	P	RS
White-striped Freetail-bat <i>Tadarida australis</i>	+4	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+4	P	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	

Moderate Ranking Fauna Sites

Fourteen sites of remnant bushland greater than 50ha in area within the CMA were identified as having a moderate fauna ranking. All of these sites comprised sites less than 200 ha in area. Three sites comprise land that is either totally or partially reserved as crown land for nature conservation managed by DECC. The remaining sites include predominantly Commonwealth land (Ingleburn), private land (Hoxton Park, Denham Court, St Andrews) or comprise land that either predominantly consists of council reserves or is made up of a variety of land tenures.



Map iv: Native Vegetation Remnants with Moderate Fauna Significance

Site 36: BRADLEYS HEAD - MIDDLE HEAD

Location:

Sydney Harbour NP comprising Bradleys Head, Chowder Head, Clifton Gardens, Georges Head and Middle Head and adjacent Department of Defence land in HMAS Penguin (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Middle Harbour

Local Government Area:

Mosman

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	88	75
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other (including Commonwealth land)	30	25
Total	119	100

Environmental Setting:



Looking over Middle Head from Georges Heights towards North Head. M Schulz/DECC



View of the city peeping through the foliage of eucalypts on Bradleys Head. M. Schulz/DECC



Typical rocky coastline fringed upslope by woodland in the site, such as on the west side of Bradleys Head. M. Schulz/DECC

This site comprises part of the spectacular coastline on the northern shoreline of Sydney Harbour, forming two units separated by the former Army Maritime School in the Chowder Bay area. The site has recognised historic significance, including Middle Head/Georges Head complex of fortifications, Bradleys Head fortifications, with a battery at Georges Head being one of the oldest European structures in Australia. The landscape is dominated by natural and semi-natural vegetation on Hawkesbury Sandstone of moderate relief with steep slopes and low cliffs above a rocky shoreline, with some small sandy beaches. Unlike adjacent shorelines, this section of Sydney Harbour has not been built out since it was required for military installations in the past. Most of these areas have now become incorporated into Sydney Harbour NP since developments in military technology, such as missiles and tactical nuclear weapons resulted in coastal armaments becoming obsolete with their decommissioning occurring in the 1960s. Vegetation communities are typically woodland to open forest dominated by a variety of species such as Smooth-barked Apple *Angophora costata*, Sydney Peppermint *E. piperita*, Bangalay *Eucalyptus botryoides*, Grey Gum *E. punctata* and Red Bloodwood *Corymbia gummifera*. There are patches of closed heathland dominated by Tick Bush *Kunzea ambigua* and Paper-bark *Melaleuca nodosa*; on the more protected slopes and in gullies closed forest dominated by Lillypilly *Acmena smithii*, Sweet Pittosporum *Pittosporum undulatum* and Cheese Tree *Glochidion ferdinandii* with or without Bangalay emergents; and on more exposed headlands patches of Sandstone Headland Heath dominated by Scrub She-oak *Allocasuarina distyla* and Heath Banksia *Banksia ericifolia*. Much of the vegetation has been disturbed due to former military land management practices. Areas of existing vegetation are subject to weed infestation, tree dieback, some of which is associated with Root-rot Fungus *Phytophthora cinnamomi*, and altered fire regimes resulting in a dominance of Sweet Pittosporum and other pioneer rainforest species in the shrub layer. The area is heavily frequented by people both via a network of formal and informal walking tracks and from the sea. It is not directly linked by continuous vegetation to other larger bushland remnants within the local area. The site supports two priority fauna habitats: rainforest and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Moderate	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a fauna typical of the shoreline fringing undeveloped sections of the northern coast of Sydney Harbour, with notable species including occasional sightings of the endangered Swift Parrot; populations of the vulnerable Red-crowned Toadlet; the Water-rat which is uncommon and localised in distribution in the CMA; and a number of reptile species that are regionally significant, such as the Diamond Python.



The diversity of waterbirds along the shoreline is low, although species such as this Little Pied Cormorant are relatively common. M. Schulz



The bat fauna is virtually unknown within the site requiring targeted survey work. M. Schulz



A number of species have disappeared from the site, such as the regionally significant Crested Shrike-tit. M. Schulz

Priority Fauna Species Review:

There have been 95 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 62 birds, 16 reptiles, 12 mammals and five frogs. Of these one is considered endangered and three as vulnerable (discussed below). A further six are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2007 (Current study)	Crown: DECC	Scattered records in the Bradleys Head and Taylors Gully area (NSW National Parks and Wildlife Service 2002d; Current study).
Swift Parrot	Endangered	1998 (Atlas record)	Crown: DECC	Rare visitor. Several records of small flocks in the Taronga Zoo–Bradleys Head area in May 1998 (Swift Parrot Recovery Program database, DECC). Additionally, an old record from Bradleys Head in July 1973 (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Crown: DECC	Forages in the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2000 (Atlas record)	Widespread foraging habitat; roost: DECC	Recorded roosting in Middle Head Forts (Atlas of NSW Wildlife records), with some interpretative signs erected. No evidence of this bat in the Lower Middle Head tunnels in Sept 2007 (Current study). May roost in other decommissioned military emplacements within the site, depending on gates installed.

* As listed under TSC Act 1995.

Additional Faunal Values: Cave-dwelling bat roost located in tunnels associated with decommissioned gun emplacements at Middle Head and Lower Middle Head. *Note:* Current installed gates are likely to form a barrier for regular use by the Eastern Bentwing-bat at the old gun

emplacements (see Thomson 2002; Gration 2006). These tunnels could be enhanced as roosts by this species by altering gate design at one critical entrance of each tunnel complex (see Thomson 2002).

Identified Threats to Fauna Values:

High: Lack of direct habitat connectivity to other bushland remnants; habitat degradation in parts due to high public visitation; tree dieback, including from Root-rot Fungus; weed infestation; water quality associated with run-off from upslope urban areas; altered fire regime; gating of tunnels and other underground installations associated with decommissioned gunneries resulting in only limited use by threatened cave-dwelling bats species (refer to Gration 2006; Thomson 2002).

Moderate: Predation by feral predators (such as the Black Rat, Fox and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; housing encroachment on to fringing bushland areas; erosion; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle.



Tree dieback is prevalent in many parts of the site. M. Schulz/DECC



Tree hollows are relatively common, such as seen in this old Bangalay. M. Schulz/DECC



Due to the low fire frequency many areas are being overtaken by pioneer rainforest species, particularly the Sweet Pittosporum. M. Schulz/DECC

Land Management:

The site is primarily managed by DECC as part of Sydney Harbour NP. The remainder of the site consists of bushland on Department of Defence land (HMAS Penguin).

References and Further Reading:

Australian Museum Business Services (1997a, 1999), Gration (2006), Keith (2004), Manly Council (2006), Morris (1986), NSW National Parks and Wildlife Service (2002c, d), Sydney Harbour Federation Trust (2004), Thomson (2002).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 - NSW National Parks and Wildlife Service (2002d); +5 - Swift Parrot Recovery Program database, DECC; +6 – AMBS (1999); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris 1986); *3 – only recorded prior to 1997 (AMBS 1997a, 1999); *4 - only recorded prior to 1997 (Records from various observers posted on the Birding-aus website).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+6	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+6	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Peron's Tree Frog <i>Litoria peronii</i>	+6	P	
Reptiles:			

Species	Status	Legal Status	Regional Status
Broad-tailed Gecko <i>Phyllurus platurus</i>	+2	P	
Burton's Legless-lizard <i>Lialis burtonis</i>	+2	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+2	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+6	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+6	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+6	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+6	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+6	P	
Diamond Python <i>Morelia spilota spilota</i>	+2	P	RS
Mainland Tiger Snake <i>Notechis scutatus</i>	*1	P	RS
Birds:			
Australian Brush-turkey <i>Alectura lathami</i>	*4	P	RS
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+6	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	*2	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Cattle Egret <i>Ardea ibis</i>	*2	P	
Striated Heron <i>Butorides striatus</i>	+2	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	*2	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+6	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*1	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Little Eagle <i>Hieraetus morphnoides</i>	*2	P	RS
Australian Hobby <i>Falco longipennis</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Lewin's Rail <i>Rallus pectoralis</i>	*1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Common Tern <i>Sterna hirundo</i>	*2	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	*1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Emerald Dove <i>Chalcophaps indica</i>	*4	P	RS

Species	Status	Legal Status	Regional Status
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Wonga Pigeon <i>Leucosarcia melanoleuca</i>	*2	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	*1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+6	P	
Swift Parrot <i>Lathamus discolor</i>	+5	E1	
Brush Cuckoo <i>Cacomantis variolosus</i>	*2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites basalis</i>	*1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	*1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	*2	P	
Dollarbird <i>Eurystomus orientalis</i>	*1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	*1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	*1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	*1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	*1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	*1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	*1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	*1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	*1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Jacky Winter <i>Microeca fascinans</i>	*1	P	RS
Eastern Yellow Robin <i>Eopsaltria australis</i>	*1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	*1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	*1	P	RS

Species	Status	Legal Status	Regional Status
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+6	P	
Spectacled Monarch <i>Monarcha trivirgatus</i>	*1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	*1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	*1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	*1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+2	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+6	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+6	U	
Red-browed Finch <i>Neochmia temporalis</i>	*1	P	
European Goldfinch <i>Carduelis carduelis</i>	*1	U	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	*2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	*2	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+6	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Water-rat <i>Hydromys chrysogaster</i>	+2	P	RS
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 37: MIRAMBEENA REGIONAL PARK

Location:

Mirambeena Regional Park, Lansdowne Park, Boggabilla Reserve, adjoining areas of Prospect Creek and fringing bushland in Liverpool Golf Course (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Bankstown and Fairfield

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	3	1
Other (including Public Land)	171	99
Total	174	100

Environmental Setting:



Remnant grassy woodland, Mirambeena Regional Park. M. Schulz/DECC



Mangrove-lined Prospect Creek. M. Schulz/DECC



Remnant Blue Box – Swamp Oak, Lake Gillawarna. M. Schulz/DECC

The site comprises a series of ridges located on Wianamatta Group shales and sandstones rising above Prospect Creek that are aligned in an east-west direction and are dissected by several permanent or intermittent flowing drainage channels. The area supports a diversity of vegetation communities, including four associations that have been identified as endangered ecological communities under the TSC Act 1995 (Cumberland Plain Woodland, Sydney Turpentine - Ironbark Forest, Cooks River/Castlereagh Ironbark Forest and River-flat Eucalypt Forest on Coastal Floodplains). The dominant vegetation on the upslope of Prospect Creek is Cumberland Plain Woodland, while a diversity of vegetation occurs adjacent to the creek including a band of mangrove forest. There are plantings of a variety of non-indigenous plants in sections of the site. A number of artificial or landscaped wetlands and lakes occur. The western boundary of the site includes remnant vegetation between the creek and mowed grass areas of the Liverpool Golf Course. The reserves in this site are heavily bisected by tracks and interspersed with open manicured grass landscapes (particularly Mirambeena Regional Park), including under stands of remnant trees. Sections of the site, particularly Lansdowne Reserve are currently being managed mostly as a natural reserve and its natural vegetation allowed to regenerate (Bankstown City Council 2002a). A large amount of bush regeneration effort has been devoted to clearing the remnant vegetation of a variety of environmental weeds. It lies immediately adjacent to the Georges River fauna corridor (e.g. Chipping Norton site). The site supports five priority fauna habitats: forested wetland, grassy woodland, alluvial forest and woodland, freshwater wetland, saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Moderately Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a nesting colony of the Australian White Ibis and a woodland fauna assemblage that is uncommon in the inner Sydney area, such as the Painted Button-quail, Weebill and Crested Shrike-tit.



A variety of common waterbirds occur, such as the Australian Wood Duck. M. Schulz



The Common Brushtail Possum is relatively common in the site. N. Williams



The Pale-flecked Garden Sunskink is common in woodland areas without a mowed ground layer. N. Williams

Priority Fauna Species Review:

There have been 138 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 112 birds, 12 reptiles, nine mammals and five frogs. Of these one is considered vulnerable (discussed below). A further 16 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
**Green and Golden Bell Frog	Endangered	1975 (Atlas record)	Bankstown Council	Presumed extinct.
**Bush Stone-curlew	Endangered	Prior to 1997 (McKay & Nordstrom 1997)	Uncertain	Locally extinct.
**Regent Honeyeater	Endangered	1992 (Atlas record)	Bankstown Council	May occasionally visit when autumn and winter flowering trees are in blossom.
**Black-chinned Honeyeater	Vulnerable	Prior to 1997 (McKay & Nordstrom 1997)	Uncertain	No recent records. May occur as a vagrant.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** only recorded prior to 1997.

Additional Faunal Values: Colony of nesting waterbirds in Lake Gillawarna (Darter, two species of cormorants and particularly the Australian White Ibis; see Bankstown Council 2004b).

Identified Threats to Fauna Values:

High: Limited habitat link with the Georges River corridor due to parkland landscape along Prospect Creek; habitat discontinuity within the site due to extensive mowed areas and Henry Lawson Drive; removal of dead trees and live trees with hollows; mowing under stands of trees (particularly in Mirambeena Regional Reserve) that prevents regeneration and the development of native shrubs and ground layer vegetation; water quality (both in Prospect Creek and the wetlands within the site); weed infestation; feral fish populations (particularly the Mosquitofish *Gambusia holbrooki*); infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Moderate: Disturbance by uncontrolled domestic dogs; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); predation by domestic cats; impacts of Rabbit grazing; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; rubbish dumping; impact of Australian White Ibis colony on other waterbirds at Lake Gillawarna.



Nesting Australian White Ibis, Lake Gillawarna. M. Schulz/DECC



Low fauna diversity occurs in woodland remnants with a mowed ground layer. M. Schulz/DECC



Remnant shrub layer in grassy woodland after weed removal, Mirambeena Regional Park. M. Schulz/DECC

Land Management:

The site largely comprising Mirambeena Regional Park, Lansdowne Park, Beatty Reserve and Boggabilla Reserve that are managed by Bankstown City Council. Remnant vegetation on the western side of Prospect Creek is managed by Fairfield Council as part of Liverpool Golf Course. Sections are also managed by a number of government agencies, such as Department of Lands, Department of Planning and Sydney Water.

References and Further Reading:

Bankstown City Council (2002a, 2004b), DEC (2005b), DECC (2005), Fairley & Waterhouse (2005), Keith (2004), McKay & Nordstrom (1997), NSW National Parks and Wildlife Service (2001c, d, 2003).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 –DEC (2006); +5 - McKay & Nordstrom (1997) and Bankstown City Council (2002a); +6 – Habitat Box Survey (K. Godfrey, Bankstown City Council, pers. comm.); +7 – Bankstown Council (2004b); +8 - Fairley & Waterhouse (2005); *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 - only recorded prior to 1997 (McKay & Nordstrom 1997; Bankstown City Council 2002a).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+7	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Green and Golden Bell Frog <i>Litoria aurea</i>	*1	E1	Locally Extinct
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+7	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Short-necked Turtle <i>Emydura</i> sp.	+1	P	RS
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	

Species	Status	Legal Status	Regional Status
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+8	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+8	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+8	P	
Birds:			
Musk Duck <i>Biziura lobata</i>	*2	P	
Black Swan <i>Cygnus atratus</i>	+5	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Mallard <i>Anas platyrhynchos</i>	*2	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Black Swan <i>Cygnus atratus</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Hoary-headed Grebe <i>Poliocephalus poliocephalus</i>	+8	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	*2	P	
White-necked Heron <i>Ardea pacifica</i>	*2	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	+5	P	
Cattle Egret <i>Ardea ibis</i>	+5	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+2	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	*2	P	
Royal Spoonbill <i>Platalea regia</i>	+5	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	+5	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*2	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	*2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Peregrine Falcon <i>Falco peregrinus</i>	+8	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+4	P	RS
Bush Stone-curlew <i>Burhinus grallarius</i>	*2	E1	Locally Extinct
Black-fronted Dotterel <i>Elsayornis melanops</i>	+1	P	

Species	Status	Legal Status	Regional Status
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Common Bronzewing <i>Phaps chalcoptera</i>	*2	P	RS
Peaceful Dove <i>Geopelia placida</i>	+2	P	RS
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Cockatiel <i>Nymphicus hollandicus</i>	+2	P	Escapee?
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	*2	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	*2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	*2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	*2	P	
Pacific Koel <i>Eudynamis orientalis</i>	+2	P	
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	+6	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+5	P	
Azure Kingfisher <i>Alcedo azurea</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+5	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+4	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Weebill <i>Smicrornis brevirostris</i>	+2	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+4	P	
Brown Thornbill <i>Acanthiza pusilla</i>	*2	P	
Buff-rumped Thornbill <i>Acanthiza reguloides</i>	*2	P	RS
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+5	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+2	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*1	E1	
Bell Miner <i>Manorina melanophrys</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	

Species	Status	Legal Status	Regional Status
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Black-chinned Honeyeater <i>Melithreptus gularis</i>	*2	V	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	*2	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+5	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+4	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Jacky Winter <i>Microeca fascinans</i>	+2	P	RS
Flame Robin <i>Petroica phoenicea</i>	*2	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+4	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+2	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	+8	P	
Restless Flycatcher <i>Myiagra inquieta</i>	*2	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	*1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+4	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*2	P	RS
Cicadabird <i>Coracina tenuirostris</i>	*2	P	
White-winged Triller <i>Lalage tricolor</i>	+2	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Masked Woodswallow <i>Artamus personatus</i>	*2	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*2	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+4	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	*2	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Zebra Finch <i>Taeniopygia guttata</i>	+5	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+5	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	*1	U	
European Goldfinch <i>Carduelis carduelis</i>	+5	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Hirundo nigricans</i>	*2	P	
Fairy Martin <i>Petrochelidon ariel</i>	+2	P	

Species	Status	Legal Status	Regional Status
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+4	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Little Grassbird <i>Megalurus gramineus</i>	*2	P	RS
Rufous Songlark <i>Cincloramphus mathewsi</i>	*2	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	+2	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+2	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rusa Deer <i>Cervus timorensis</i>	+4	U	

Site 38: SALT PAN CREEK

Location:

Salt Pan Creek and adjacent bushland from Thorpe Park upstream to south of Canterbury Road (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Bankstown, Canterbury and Hurstville

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	3	2
Crown Land	10	7
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	118	90
Total	131	100

Environmental Setting:



Extensive boardwalk network through the White Mangrove forest along mid to upper Salt Pan Creek. M. Schulz/DECC



Remnant woodland on Hawkesbury Sandstone overlooking the lower reaches of Salt Pan Creek. M. Schulz/DECC



Saltmarsh north of the M5 Motorway crossing. M. Schulz/DECC

Salt Pan Creek estuary is a combination of flat floodplains and steep rocky slopes of Hawkesbury Sandstone resulting in a diverse range of vegetation communities (Bankstown City Council 2005). Vegetation includes woodland remnants associated with Hawkesbury Sandstone; small areas of freshwater wetlands; mangroves and saltmarsh (an endangered ecological community) associated with intertidal sections of the estuary (Bankstown City Council 2005). Land clearing due to development has resulted in large quantities of silt deposited in the estuary favouring the growth of mangrove forests. As a result of past land management there are very few hollows present in remnant vegetation along the creek. Rubbish dumping was common at Salt Pan Creek until recently, these now capped fill areas may be a significant source of contaminated leachate (Bankstown City Council 1999; Munston & Associates 1999). Extensive formerly cleared areas have been planted with a variety of species native to the area. A large amount of bush regeneration effort has been devoted to clearing the remnant vegetation of a variety of environmental weeds in sections managed by the three city councils. The site is tenuously linked to the Georges River fauna corridor due to the presence of waterfront houses. It supports three priority fauna habitats: forested wetland, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Moderately Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports fauna typical of the upper tidal reaches of the Georges River.



Waterbirds on Salt Pan Creek, north of the railway bridge. M. Schulz/DECC



A White-faced Heron taking a break on the toilet roof, Davies Reserve. M. Schulz/DECC



Powerful Owl with a Common Ringtail Possum, Salt Pan Creek. M. Schulz/DECC

Priority Fauna Species Review:

There have been 106 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 75 birds, 16 reptiles, eight mammals and seven frogs. Of these three are considered vulnerable and one endangered ecological fauna community occurs (these are discussed below). A further six are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Osprey	Vulnerable	2007 (Current study)	Crown	Uncommon visitor that ranges into the lower and mid reaches of Salt Pan Creek, such as in the One Tree Point area (Current study; Russill & Russill 2004).
Shorebird community ¹	Endangered Ecological Community	2007 (Current study)	Crown	A few individuals from this community (i.e. Bar-tailed Godwit) occasionally forage on the intertidal mudflats along Salt Pan Creek.
Powerful Owl	Vulnerable	2007 (Current study)	Bankstown Council	One record of a perched individual spotlighted holding a half-eaten Common Ringtail Possum downstream of Davies Reserve in July 2007(Current study). Unlikely to nest in the site due to the lack of large hollows, rather had probably moved along the creek corridor from nearby Georges River NP.
**Regent Honeyeater	Endangered	1984 (Regent Honeyeater Recovery program database, DECC)	Bankstown Council	Recorded from Salt Pan Reserve in 1984 (Regent Honeyeater Recovery Program database, DECC).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** Only recorded prior to 1997; ¹ Endangered Ecological Fauna Community: Shorebird community occurring on the relict tidal delta sands of Botany Bay between Taren and Shell Points.

Additional Faunal Values: Tidal flats are occasionally used as a foraging site by small numbers of the migratory shorebirds.

Identified Threats to Fauna Values:

High: Limited habitat link with the Georges River corridor due to narrow remnant vegetation band and breaks in this 'continuous' vegetation band by houses and associated development to the high tide mark in the lower reaches; housing encroachment on to remnant habitat; death of canopy trees

(possibly associated with housing encroachment); water quality, including contaminated leachate; siltation; weed infestation, particularly from Bridal Creeper *Asparagus asparagoides* and Spiny Rush *Juncus acutus*; mangrove encroachment into saltmarsh areas; disturbance to waterbirds in lower reaches by watercraft, including jet skis.

Moderate: Disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle; wildlife poaching; impacts associated with easements.



Numerous easements occur within the site. M. Schulz/DECC



Urban encroachment, Salt Pan Creek. M. Schulz/DEC



M5 Motorway crossing Salt Pan Creek. M. Schulz/DECC

Land Management:

The majority of the remnant vegetation fringing Salt Pan Creek is managed by Bankstown, Canterbury and Hurstville City Councils; with some adjacent sections owned by various private landholders. There are a number of easements bisecting the site managed by a variety of companies and government agencies, such as Energy Australia, Trans Grid, RTA, RailCorp and Sydney Water. Salt Pan Creek including its estuarine vegetation is Crown Land. Any work within this area with respect to migratory shorebirds will require a cooperative approach to managing the site, in conjunction with other migratory shorebird/waterbird sites in the Botany Bay/lower Georges River area such as those used by Endangered Ecological Shorebird community occurring on the relict tidal delta sands of Botany Bay. Management is perhaps best served by the development of an overall plan of management.

References and Further Reading:

Bankstown City Council (1999, 2001, 2002b, 2005a, b), Keith (2004), Muston & Associates (1999), NSW National Parks and Wildlife Service (2001d), NSW Scientific Committee (1998), Russill & Russill (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Bankstown City Council (2005); +5 – Nest box monitoring, Salt Pan Reserve (K. Godfrey, Bankstown City Council); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 - only recorded prior to 1997 (Regent Honeyeater Recovery Program database, DECC); *2 – only recorded prior to 1997 (Bankstown City Council fauna database).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Eastern Banjo Frog <i>Limnodynastes dumerilii</i>	+4	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Marsh Frog <i>Limnodynastes tasmaniensis</i>	+4	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+4	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+4	P	

Species	Status	Legal Status	Regional Status
Tyler's Tree Frog <i>Litoria tyleri</i>	+4	P	
Reptiles:			
Red-eared Slider <i>Trachemys scripta elegans</i>	+1	U	
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	+4	P	
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	*2	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+4	P	
Lace Monitor <i>Varanus varius</i>	*2	P	RS
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+4	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+4	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	*2	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+4	P	
Diamond Python <i>Morelia spilota spilota</i>	*2	P	RS
Green Tree Snake <i>Dendrelaphis punctulata</i>	+4	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	*2	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+4	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+4	P	
Birds:			
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	*2	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	+1	P	
White-necked Heron <i>Ardea pacifica</i>	*2	P	
Great Egret <i>Ardea alba</i>	*2	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	+1	P	RS
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Royal Spoonbill <i>Platalea regia</i>	+2	P	
Osprey <i>Pandion haliaetus</i>	+1	V	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Swamp Harrier <i>Circus approximans</i>	*2	P	

Species	Status	Legal Status	Regional Status
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Bar-tailed Godwit <i>Limosa lapponica</i>	+1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+2	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+4	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Dollarbird <i>Eurystomus orientalis</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	*2	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	*1	E1	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	*2	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	*2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	*2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	

Species	Status	Legal Status	Regional Status
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	*2	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	*2	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
European Goldfinch <i>Carduelis carduelis</i>	+4	U	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Hirundo ariel</i>	*2	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	*2	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	*	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+1	P	RS
Golden-headed Cisticola <i>Cisticola exilis</i>	*2	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+5	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	

Site 39: HOXTON PARK

Location:

Remnant bushland to the east and west of Hoxton Park Airport in the Cecil Park–West Hoxton area (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Liverpool

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other (including Public land)	106	100
Total	106	100

Environmental Setting:



Swamp Oak and Forest Red Gums lining Hinchinbrook Creek. M. Schulz/DECC



Alluvial woodland dominated by Forest Red Gum adjacent to Hinchinbrook Creek. M. Schulz/DECC



Bushland within the site is disrupted by Hoxton Park Airport and the M7 Motorway. M. Schulz/DECC

This site forms two discrete areas disrupted by the M7 Motorway and the Hoxton Park Airport. It is situated on the transition between rural and urban landscapes within the upper Georges River catchment centred on Hinchinbrook Creek. The site is characterised by low rolling rises on Wianamatta Group shales with deep layered sediments prone to frequent flooding along Hinchinbrook Creek and associated drainage lines. The vegetation is dominated by Cumberland Plain woodland and stands of alluvial forest and woodland including Spotted Gum *Corymbia maculata* on the lower slopes, with Swamp Oak *Casuarina glauca* Floodplain Forest along the watercourses. All major vegetation communities within the site are listed as endangered ecological communities under the TSC Act (1995). A number of ponds and reedbed areas associated with stormwater control are located on the eastern side of Hinchinbrook Creek. Much of the remnant bushland comprises regeneration from past clearing activities and the area on the western side of the M7 Motorway is subject to grazing, trampling and below canopy habitat modification from livestock. This site is not linked by continuous vegetation with any conservation reserves within the Liverpool and surrounding LGAs. The site primarily comprises four priority fauna habitats in the form of forested wetland, grassy woodland, alluvial forest and woodland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Fauna present is characteristic of grassy woodlands, although relatively low in diversity due to the site's isolation from conservation reserves.



Verreaux's Tree frog is one of a number of frogs recorded from the site. M. Schulz



Scattered old growth trees support hollows within the site, such as the one in this Spotted Gum that is being investigated by a pair of Galahs. M. Schulz



Surprisingly some Eastern Grey Kangaroos occur within the site. M. Schulz

Priority Fauna Species Review:

There have been 107 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 71 birds, 19 mammals, 12 reptiles and five frogs. Of these four species are considered vulnerable (discussed below). A further 14 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Koala	Vulnerable	2003 (Atlas record)	Private	The only documented record is of a single individual adjacent to Hinchinbrook Creek on the western side of the M7 Motorway in July 2003 (Atlas of NSW Wildlife record). Status within the site is uncertain.
East-coast Freetail-bat	Vulnerable	1999 (Atlas record)	Widespread	Three individuals detected using Anabat in the Hoxton Park Airport section of the site in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost (Westlink)	Detected around the Hoxton Park Airport section of the site in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. A minimum of three individuals located roosting in concrete joins under the M7 Motorway bridge crossing Hinchinbrook Creek in Aug 2007 (Current study).
Southern Myotis	Vulnerable	2003 (Atlas record)	Widespread along Hinchinbrook Creek	Detected using Anabat along Hinchinbrook Creek west of the M7 Motorway in July 2003 (Atlas of NSW Wildlife record). Likely to forage widely along major watercourses and over wetlands within the site. May roost in the same location as the Eastern Bentwing-bats under the M7 Motorway bridge crossing Hinchinbrook Creek.

* As listed under TSC Act 1995.

Additional Faunal Values: Cave-dwelling bat roost located in bridge under the M7 Motorway. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Current study; Atlas of NSW Wildlife records).

Identified Threats to Fauna Values:

High: Habitat loss; weed infestation; water quality as a result of runoff from adjacent farming land, urban areas and roads; impacts associated with the M7 Motorway and Hoxton Park Airport; trampling and grazing by livestock; loss of remaining hollow-bearing trees; feral fish populations, particularly the Mosquito Fish *Gambusia holbrooki* in wetlands.

Moderate: Predation by feral predators (such as the Black Rat, Fox and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; impacts of Rabbit grazing; competition for hollows by feral Honeybees *Apis mellifera*; rubbish dumping.



The M7 Motorway forms a major barrier between the eastern and western bushland remnants within the site. M. Schulz/DECC



Potential threats to fauna within the site include impacts from the Hoxton Park Airport. M. Schulz/DECC



Pondages adjacent to Hinchinbrook Creek provide aquatic fauna habitat. M. Schulz/DECC

Land Management:

This site primarily comprises private land, including bushland on the eastern edge of Hoxton Park Airport. Wetlands on the eastern side of Hinchinbrook Creek, south of Lascelles Street, Cecil Park are managed by Sydney Water and Liverpool City Council. The site is bisected by the M7 Motorway and adjacent easements including vegetation protection zones are managed by Westlink.

References and Further Reading:

Bewsher Consulting (2004), Keith (2004), Liverpool City Council (2001, 2003), NSW National Parks and Wildlife Service (2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife; * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Eastern Bearded Dragon <i>Pogona barbata</i>	+1	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Mainland Tiger Snake <i>Notechis scutatus</i>	+2	P	RS
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+1	P	RS
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Pacific Baza <i>Aviceda subcristata</i>	+2	P	RS
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Wedge-tailed Eagle <i>Aquila audax</i>	+2	P	RS
Little Eagle <i>Hieraetus morphnoides</i>	+1	P	RS
Australian Hobby <i>Falco longipennis</i>	+2	P	
Brown Falcon <i>Falco berigora</i>	+1	P	
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*	P	RS
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	

Species	Status	Legal Status	Regional Status
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variegated Fairy-wren <i>Malurus lamberti</i>	+2	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Weebill <i>Smicromnis brevirostris</i>	+1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
White-winged Chough <i>Corcorax melanorhamphos</i>	*	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	*	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Bassian Thrush <i>Zoothera lunulata</i>	*	P	RS
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Sugar Glider <i>Petaurus breviceps</i>	*	P	
Eastern Grey Kangaroo <i>Macropus giganteus</i>	+1	P	RS
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	

Species	Status	Legal Status	Regional Status
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	

Site 40: INGLEBURN

Location:

Remnant bushland on the northern side of Ingleburn Military Camp north to the Tree Valley Golf Course (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Campbelltown and Liverpool

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	1	2
Other (including land managed by the Department of Defence)	58	98
Total	59	100

Environmental Setting:



Grey Box woodland is the dominant vegetation type within the site. M. Schulz/DECC



Swamp Oak forest occurs along some drainage lines within the site. M. Schulz/DECC



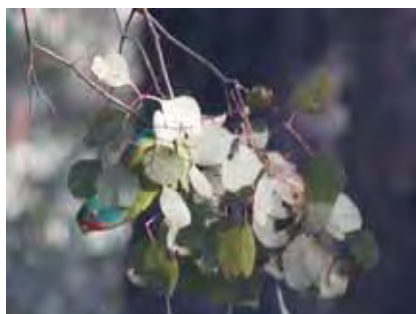
Forest Red Gum woodland with Cherry Ballart and Blackthorn dominated shrub layer. M. Schulz/DECC

This site is situated within the Georges River catchment bordered to the east by the South Western Highway. It is characterised by low rolling rises on Wianamatta Group shales with deep layered sediments prone to frequent flooding along drainage lines. This site forms part of the Ingleburn Military Camp which was the first purpose built training camp for World War Two that played a central role in the mobilisation of Australian citizens and a lesser role in subsequent conflicts (Aussie Heritage 2007). The vegetation is dominated by Cumberland Plain woodland, with stands of alluvial forest and woodland on lower slopes and Swamp Oak *Casuarina glauca* Floodplain Forest along the watercourses; all endangered ecological communities (TSC Act 1995). Despite the management history of the site, the vegetation remains a good example of all three endangered ecological communities. Unlike nearby sites that are dominated by Cumberland Plain woodland, this site has currently low and localised infestations of African Olive *Olea europaea* subspecies *cuspidata* and the shrub and ground layer vegetation is in relatively pristine condition; a rare occurrence within this habitat in the Cumberland Plain. A number of treatment ponds as part of the Liverpool Sewerage Treatment Plant provide habitat for waterbirds and frogs. This site is not linked by continuous vegetation with any conservation reserves within the Campbelltown, Liverpool and surrounding LGAs. The site almost entirely comprises three priority fauna habitats in the form of forested wetland, grassy woodland and alluvial forest and woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Fauna present is characteristic of grassy woodlands, although relatively low in diversity due to the site's isolation from conservation reserves.



The Endangered Swift Parrot is likely to occur in the site when species such as Grey Box are in flower. M. Schulz



The Eastern Freetail-bat is one of a number of bat species known from the site. N. Williams



The Mainland Tiger Snake is a rare species within the CMA but occurs within the site. DECC

Priority Fauna Species Review:

There have been 124 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 86 birds, 17 mammals, 13 reptiles and eight frogs. Of these four species are considered vulnerable (discussed below). A further 14 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages in the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	1999 (Atlas record)	Widespread	One detected using Anabat in the site in Sept 1998 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	1999 (Atlas record)	Widespread	Detected in the site in Feb 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. No known roosts within the site.
Greater Broad-nosed Bat	Vulnerable	1999 (Atlas record)	Widespread	Detected using Anabat in the site in Sept 1998 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Nil for vertebrate species. The Cumberland Plain Land Snail *Meridolum corneovirens* listed as Endangered under the TSC Act 1995 has been recorded in the site (Current study; Atlas of NSW Wildlife records).

Identified Threats to Fauna Values:

High: Habitat loss; weed infestation (particularly the African Olive); water quality as a result of runoff from adjacent farming land and roads, such as the South Western Highway; loss of remaining hollow-bearing trees.

Moderate: Predation by feral predators (such as the Black Rat, Fox and Feral Dog); impacts of Rabbit grazing; competition for hollows by feral Honeybees *Apis mellifera*; rubbish dumping; barbwire fence entanglement (for the Grey-headed Flying-fox).



Unlike adjacent Cumberland Woodland dominated sites, the African Olive is as yet localised in occurrence within the site. M. Schulz/DECC



Campbelltown Road bisects the southern part of the site. M. Schulz/DECC



Illegal rubbish dumping is commonplace within the site on the north side of Campbelltown Road. M. Schulz/DECC

Land Management:

This site primarily comprises land managed as the Ingleburn Military Camp and Ingleburn Sewerage Treatment Plant, managed by the ADF and Sydney Water respectively. The northern edge of the site occurs within the Tree Valley Golf Course. One major road, Campbelltown Road and a high-voltage power line easement bisects the area from east to west.

References and Further Reading:

Aussie Heritage (2007), Campbelltown City Council (2003, 2004), Keith (2004), Liverpool City Council (2001, 2003), NSW National Parks and Wildlife Service (2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – G. Madani, DECC, pers. comm.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Bibron's Toadlet <i>Pseudophryne bibronii</i>	+2	P	RS
Smooth Toadlet <i>Uperoleia laevigata</i>	+1	P	RS
Keferstein's Tree Frog <i>Litoria dentata</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Lace Monitor <i>Varanus varius</i>	+2	P	RS
Tree-base Litter-skink <i>Carlia foliorum</i>	+1	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Mainland Tiger Snake <i>Notechis scutatus</i>	+1	P	RS
Eastern Brown Snake <i>Pseudonaja textilis</i>	+4	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+2	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Cattle Egret <i>Ardea ibis</i>	+1	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Little Eagle <i>Hieraetus morphnoides</i>	+2	P	RS
Australian Hobby <i>Falco longipennis</i>	+2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+3	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+3	P	
Little Lorikeet <i>Glossopsitta pusilla</i>	+3	P	
Crimson Rosella <i>Platycercus elegans</i>	+2	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Weebill <i>Smicrornis brevirostris</i>	+1	P	RS
White-throated Gerygone <i>Gerygone olivacea</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+2	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+2	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Varied Sittella <i>Daphoenositta chrysoptera</i>	+1	P	RS
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
House Sparrow <i>Passer domesticus</i>	+2	U	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	

Species	Status	Legal Status	Regional Status
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
Gould's Long-eared Bat <i>Nyctophilus gouldi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Brown Hare <i>Lepus capensis</i>	+1	U	

Site 41: DEVLINS CREEK

Location:

Devlins Creek and fringing remnant vegetation from Pennant Hills Golf Club, Beecroft downstream to Cheltenham Park in the suburb of Cheltenham (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Lane Cove River

Local Government Area:

Hornsby

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	6	15
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	33	85
Total	39	100

Environmental Setting:



Gully vegetation along Devlins Creek. M. Schulz/DECC



Much of the site is managed as council reserves. M. Schulz/DECC



Sydney Turpentine- Ironbark forest upslope of Devlins Creek, Beecroft Park. M. Schulz/DECC

Devlins Creek is situated within the Upper Lane Cove River catchment. This site comprises a narrow band of remnant vegetation within a highly urbanised setting. A significant section of the site is bisected or bordered by the M2 Motorway. Fringing vegetation varies from widespread woodland communities associated with Hawkesbury Sandstone to vegetation communities that are now rare within the CMA and listed as endangered ecological communities, such as Blue Gum *Eucalyptus saligna* High Forest in the Sydney Basin Bioregion and Sydney Turpentine *Syncarpia glomulifera*-Ironbark Forest. The former community is poorly represented in conservation reserves, and within this site primarily occurs on Wianamatta Group shales. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*. Sections of the site have been subjected to intensive bush regeneration activities. This site is tenuously linked by continuous vegetation with any other conservation reserves within the Hornsby and surrounding LGAs. The site supports no priority fauna habitats.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Nil	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: The fauna present is typical of a small bushland remnant within an urban setting; although of interest is the presence of several Eastern Bentwing-bat roosts.



One of the M2 Motorway bridges supporting colonies of the Eastern Bentwing-bat. M. Schulz/DECC



The Laughing Kookaburra is a common species within the site. M. Schulz



A low diversity of waterbirds occurs along Devlins Creek but includes the Chestnut Teal. M. Schulz

Priority Fauna Species Review:

There have been 70 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 57 birds, seven mammals, four reptiles and two frogs. Of these one is considered part of an endangered population and three as vulnerable (discussed below). One additional species is considered regionally significant (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Gang-gang Cockatoo	Endangered Population	2007 (V. Bear, Hornsby Shire Council, pers. comm.)	Widespread	The Endangered Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGAs is found as far west as the Beecroft–Cheltenham area, which includes the current site (Hornsby Shire Council 2002; DECC 2005). Actual status within the site is uncertain.
Powerful Owl	Vulnerable	2007 (D. Campbell, Hornsby Shire Council, pers. comm.)	Widespread	Recently recorded from the site (D. Campbell, Hornsby Shire Council, pers. comm.) and regularly recorded further downstream on Devlins Creek (P. Ewin, DECC, pers. comm.).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roosts: RTA	This species was located roosting under two bridges of the M2 Motorway over Devlins Creek on the western edge of the site in Aug 2007: three individuals under the bridge upstream of Murray Farm Road overpass and 90+ individuals in a bridge adjacent to Cheltenham Park (Current study). Likely to forage widely across the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Cave-dwelling bat roosts located in two bridges under the M2 Motorway.

Identified Threats to Fauna Values:

High: Limited habitat link with other conservation reserves within the Hornsby and surrounding LGAs; water quality, particularly stormwater run off; weed infestation.

Moderate: Housing encroachment on to fringing bushland areas; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Fox); impacts of fire; competition for hollows by feral Honeybees *Apis mellifera*; tree dieback; impacts associated with easements, the M2 Motorway and other road crossings; rubbish dumping, particularly garden waste or deposited by flood waters along Devlins Creek.



The oldest Sydney Blue Gums are situated within urban areas upslope of the site. M. Schulz/DECC



A major threat to remnant bushland within the site is urban encroachment. M. Schulz/DECC



The M2 Motorway has had a significant impact on the site. M. Schulz/DECC

Land Management:

Remnant vegetation fringing Devlins Creek is primarily managed by Hornsby Shire Council as a series of reserves, including Chilworth Recreation Reserve, Beecroft Park, Castle Howard Park and Cheltenham Park. A section of the site adjacent to the M2 Motorway is managed by the RTA and the northwestern edge of the site is situated within the grounds of the Pennant Hills Golf Club. The site is bordered by urban land.

References and Further Reading:

Fallding *et al.* (1994), Hornsby Shire Council (2002, 2004, 2006), Keith (2004), Smith & Smith (2006).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Hornsby Sire Council (2002); +5 – D. Campbell, Hornsby Shire Council, pers. comm..

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); EP – Endangered Population (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Reptiles:			
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
Pacific Baza <i>Aviceda subcristata</i>	+3	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	+4	V, EP	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+3	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+5	V	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+3	P	
Dollarbird <i>Eurystomus orientalis</i>	+3	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+3	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	+3	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	

Site 42: DOBROYD HEAD

Location:

Dobroyd Head–Grotto Point section of Sydney Harbour NP and adjacent contiguous bushland areas, including Wellings Reserve, Balgowlah Heights (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Middle Harbour

Local Government Area:

Manly

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	64	76
Crown Land	11	13
Commonwealth Land	0	0
Remaining Public Land	0	0
Other (including Public land)	9	11
Total	84	100

Environmental Setting:



The spectacular coastal scenery of Dobroyd Head. M Schulz/DECC



View over Grotto Point toward Sydney's central business district. M. Schulz/DECC



Low Smooth-barked Apple woodland is common on slightly higher nutrient soils within the site. M. Schulz/DECC

This site forms part of the spectacular coastline at the northern entrance to Sydney Harbour. The landscape is dominated by Hawkesbury Sandstone of moderate relief with steep slopes and low cliffs above a rocky shoreline, with some small sandy beaches. It supports some of the most extensive areas of little disturbed vegetation fringing Sydney Harbour, partly as a result of it having been a former military reserve. Vegetation communities present are characteristic of low nutrient Hawkesbury Sandstone, such as Sandstone Headland Heath dominated by Scrub She-oak *Allocasuarina distyla* and Heath Banksia *Banksia ericifolia*, low Smooth-barked Apple *Angophora costata*–Red Bloodwood *Corymbia gummifera* woodland and Bangalay *Eucalyptus botryoides* woodland. Within these habitats there are scattered rocky outcrops and small seepage areas, including wet heathland dominated by the shrub *Rulinga hermanniifolia* around Crater Cove. The area is heavily frequented by people both via a network of formal (such as the Manly Scenic Walkway) and informal walking tracks and from the sea. Some shacks occur within the site at Crater Cove. The site not directly linked by continuous vegetation to other larger bushland remnants within the local area. It supports one priority fauna habitats: heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a fauna typical of the headlands fringing undeveloped sections of the northern shoreline of Sydney Harbour, with notable species including a population of the vulnerable Red-crowned Toadlet; the Water-rat which is uncommon and localised in distribution in the CMA; and a number of reptile species that are regionally significant, such as the Southern Scaly-foot and Sheoak Skink.



The site supports a variety of bush birds that are widely distributed across the CMA, such as the Red-browed Finch. K. Stepnell



Despite its proximity to the heart of city a number of reptiles occur within the site, such as the Eastern Water Dragon. M. Schulz



The bat fauna is poorly known and it is likely that a number of threatened species may occur. N. Williams

Priority Fauna Species Review:

There have been 89 vertebrate fauna species (excluding fish, marine species and escapees) documented within this area in the last 10 years: 60 birds, 13 reptiles, 12 mammals and four frogs. Of these one is considered endangered and three as vulnerable (discussed below). A further 10 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2007 (Atlas record)	Crown: DECC	Scattered records mainly in the Dobroyd Head Scenic Area, with one record in Wellings Reserve adjacent to New Street, Balgowlah Heights (Atlas of NSW Wildlife records).
**Superb Fruit-Dove (VAGRANT)	Vulnerable	1968 (Atlas record)	Crown: DECC	Vagrant, with the only documented record being of one bird in Mar 1968 (Atlas of NSW Wildlife record).
Powerful Owl	Vulnerable	2005 (Atlas record)	Crown: DECC	Status uncertain. A single record from east of Arabanoo Lookout in Nov 2005 (Atlas of NSW Wildlife record).
Regent Honeyeater	Endangered	2004 (Atlas record)	Crown: DECC	Rare visitor. A single record from east of Arabanoo Lookout in July 2004 (Atlas of NSW Wildlife record).
Grey-headed Flying-fox	Vulnerable	2006 (Atlas record)	Crown: DECC	Forages in the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil. **Note:** The eastern shoreline of Dobroyd Head has been identified as potential nesting habitat for the Endangered Population of Little Penguins at Manly (NSW National Parks and Wildlife Service 2002e).

Identified Threats to Fauna Values:

High: Lack of direct habitat connectivity to other bushland remnants; habitat degradation in part due to high public visitation; weed infestation, particularly on edges of the site; altered fire regime.

Moderate: Predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; predation by domestic cats; housing encroachment on to fringing bushland areas; erosion; competition for hollows by feral Honeybees *Apis mellifera*; entanglement in discarded fishing tackle.



Recently burnt sandstone headland heath adjacent to the Manly Scenic Walkway. M. Schulz/DECC



The spectacular scenery of the site attracts a large numbers of visitors, including many foreign tourists. M. Schulz/DECC



Walking tracks have an unknown impact on Red-crowned Toadlet habitat within the site. M. Schulz/DECC

Land Management:

The site is primarily managed by DECC as part of Sydney Harbour NP. The remainder of the site consists of Crown Reserve such as in the Tania Park and Wellings Reserve areas and DPI Fisheries manages the adjoining North (Sydney) Harbour Aquatic Reserve.

References and Further Reading:

Baker (1999), Banks (1993), Hardy *et al.* (1979), Keith (2004), Manly Council (2006), Morris (1986), NSW National Parks and Wildlife Service (1996, 2002c, d, e), Skelton *et al.* (2003a), Sydney Harbour Federation Trust (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Baker (1999); +5 – D. Andrew, DECC, pers. comm.; *1 - only recorded prior to 1997 (Atlas of NSW Wildlife records); *2 – only recorded prior to 1997 (Morris 1986); *3 – only recorded prior to 1997 (Banks 1993); *4 - only recorded prior to 1997 (Hardy *et al.* 1979).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+2	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+2	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+2	V	
Reptiles:			
Eastern Stone Gecko <i>Diplodactylus vittatus</i>	*1	P	RS
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+4	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Thick-tailed Gecko <i>Underwoodisaurus milii</i>	+2	P	RS
Burton's Legless-lizard <i>Lialis burtonis</i>	*1	P	RS
Southern Scaly-foot <i>Pygopus lepidopodus</i>	+1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	*4	P	
Tree-base Litter-skink <i>Carlia foliorum</i>	*1	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Sheoak Skink <i>Cyclodomorphus michaeli</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
Cunningham's Spiny-tailed Skink <i>Egernia cunninghami</i>	+1	P	
White's Rock-skink <i>Egernia whitii</i>	*3	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	*4	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Weasel Shadenskink <i>Saproscincus mustelinus</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	*3	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Golden-crowned Snake <i>Cacophis squamulosus</i>	*1	P	RS
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+2	P	RS
Darter <i>Anhinga melanogaster</i>	+2	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	*2	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+1	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+2	P	
Peregrine Falcon <i>Falco peregrinus</i>	+2	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	*1	P	RS
Wandering Tattler <i>Heteroscelus incanus</i>	*2	P	RS
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
White-fronted Tern <i>Sterna striata</i>	*2	P	
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	+2	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Superb Fruit-Dove <i>Ptilinopus superbus</i>	*1	V	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+2	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+2	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+2	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalis</i>	*1	P	
Shining Bronze-Cuckoo <i>Chalcites basalis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	*2	P	
Powerful Owl <i>Ninox strenua</i>	+2	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	

Species	Status	Legal Status	Regional Status
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	*2	P	
Dollarbird <i>Eurystomus orientalis</i>	*2	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+2	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+2	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	*2	P	
Striated Thornbill <i>Acanthiza lineata</i>	*2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Regent Honeyeater <i>Xanthomyza phrygia</i>	+2	E1	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	*2	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	*1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	*2	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereve <i>Zosterops lateralis</i>	+2	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+2	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	*3	P	RS
Brown Antechinus <i>Antechinus stuartii</i>	+2	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+2	P	
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+2	V	
Water-rat <i>Hydromys chrysogaster</i>	+2	P	RS

Species	Status	Legal Status	Regional Status
House Mouse <i>Mus musculus</i>	*3	U	
Bush Rat <i>Rattus fuscipes</i>	+2	P	
Black Rat <i>Rattus rattus</i>	+2	U	
Brown Rat <i>Rattus norvegicus</i>	*3	U	
Fox <i>Vulpes vulpes</i>	+2	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+4	U	
Feral Cat <i>Felis catus</i>	+2	U	
Rabbit <i>Oryctolagus cuniculus</i>	+2	U	

Site 43: ENGADINE

Location:

Crown land and council reserves between Heathcote NP and the suburbs of Engadine and Heathcote (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Sutherland

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	<1	<1
Crown Land	105	93
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	7	6
Total	113	100

Environmental Setting:



The site is characterised by low sandstone cliffs with numerous cracks and crevices. M. Schulz/DECC



Scribbly Gum woodland occurs on some lower ridges. M. Schulz/DECC



Sydney Peppermint woodland dominates on the more protected slopes and gully lines. M. Schulz/DECC

The site comprises two discrete areas: a) crown land and Sutherland Shire Council reserve located between Heathcote NP and the residential areas of Engadine and Heathcote; and b) J. Harold Kaye Scout Training Centre on the western edge of Heathcote. The site is characterised by relatively little disturbed vegetation communities characteristic of the slopes and smaller watercourses on Hawkesbury Sandstone (Keith 2004). It is linked continuously on the western boundary to Heathcote NP and forms a section of the Liverpool to Appin fauna corridor. The only major breaks in habitat within the site are Heathcote Road and the Water Supply pipeline easement from Woronora Dam. The site supports no priority fauna habitats.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Highly Connected	<i>Habitat State:</i>	Continuous
<i>Tree Hollows:</i>	High	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Nil	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports fauna typical of Hawkesbury Sandstone vegetation communities; of particular note is the relatively high density of Powerful Owls present.



Lesueur's Velvet Gecko is relatively common within the site. M. Schulz



The Broad-headed Snake may potentially occur within the site. M. Schulz



A male Powerful Owl roosting in Prestons Gully. M. Schulz/DECC

Priority Fauna Species Review:

There have been 88 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 58 birds, 16 reptiles, 11 mammals and three frogs. Of these three are considered vulnerable (these are discussed below). A further 10 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
**Red-crowned Toadlet	Vulnerable	1969 (Atlas record)	Crown Reserve; Sutherland Shire	Recorded from Prestons Gully in 1969 (Atlas of NSW Wildlife record). No recent records; therefore status in site uncertain.
Koala	Vulnerable	2004 (Atlas record)	Private	Occasional individuals recorded from Forum Drive, Heathcote (Atlas of NSW Wildlife records). Likely to be only a rare visitor as had not been observed by staff at the J. Harold Kaye Scout Training Centre.
Powerful Owl	Vulnerable	2007 (Current study)	Widespread	Single roosting males were located on different sections of Prestons Gully and an additional individual responded to playback adjacent to Heathcote Creek in July 2007 (Current study). It is likely that further individuals are present in other gullies, such as Scout Creek.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower, such as the Red Bloodwood <i>Corymbia gummifera</i> . No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Fire frequency and intensity; road mortality, particularly on Heathcote Road.

Moderate: Housing encroachment on to fringing bushland areas; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Fox and Feral Dog); competition for hollows by feral Honeybees *Apis mellifera*; impacts associated with easements; rubbish dumping.



Heathcote Road forms a potential barrier to fauna within the site. M. Schulz/DECC



The Water Supply Pipeline is a major easement traversing the site. M. Schulz/DECC



The site forms part of the Liverpool-Appin fauna habitat link. M. Schulz/DECC

Land Management:

The majority of the site is Crown land, Sutherland Shire Council reserve or managed as part of the J. Harold Kaye Scout Training Centre. The site is primarily fringed to the west by Heathcote NP and individuals of many fauna species are likely to range across both this site and the NP. Management is perhaps best served by the development of an overall plan of management incorporating both areas.

References and Further Reading:

Anyon-Smith (2006), Keith (2004), NSW National Parks and Wildlife Service (2000, 2001d), Ramp *et al.* (2006).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Observations of the staff at the J. Harold Kaye Scout Training Centre; +5 - R. Ashton observations, former Engadine resident; * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	*	V	
Lesueur's Frog <i>Litoria lesueurii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+2	P	
Reptiles:			
Lesueur's Velvet Gecko <i>Oedura lesueurii</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+4	P	
Lace Monitor <i>Varanus varius</i>	+4	P	RS
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Diamond Python <i>Morelia spilota spilota</i>	+4	P	RS

Species	Status	Legal Status	Regional Status
Green Tree Snake <i>Dendrelaphis punctulata</i>	+4	P	RS
Southern Death Adder <i>Acanthophis antarcticus</i>	+5	P	RS
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+4	P	
Birds:			
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+2	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+2	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+4	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+4	P	
Superb Lyrebird <i>Menura novaehollandiae</i>	+1	P	RS
White-throated Treecreeper <i>Cormobates leucophaeus</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
Rockwarbler <i>Origma solitaria</i>	+1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-eared Honeyeater <i>Lichenostomus leucotis</i>	+1	P	
Yellow-tufted Honeyeater <i>Lichenostomus melanops</i>	+1	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	

Species	Status	Legal Status	Regional Status
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+2	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Satin Bowerbird <i>Ptilonorhynchus violaceus</i>	+4	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Short-beaked Echidna <i>Tachyglossus aculeatus</i>	+1	P	RS
Long-nosed Bandicoot <i>Perameles nasuta</i>	+2	P	RS
Koala <i>Phascolarctos cinereus</i>	+2	V	
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
House Mouse <i>Mus musculus</i>	+4	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+1	U	

Site 44: DENHAM COURT

Location:

Private land situated between Denham Court Road to the north, Campbelltown Road to the east, South Western Freeway to the south and St Andrews Road, St James Road and the Sydney Water Supply Channel to the east in the Varroville–Denham Court area (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Campbelltown

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	183	100
Total	183	100

Environmental Setting:



Remnant Cumberland Plain woodland on rolling hills in the site. M. Schulz/DECC



Grey Box woodland, typically with little hollow formation in the site. M. Schulz/DECC



Forest Red Gum woodland along drainage lines within the site. M. Schulz/DECC

This site is located within the Upper Georges River catchment. It is a remote location with little public road access situated within a largely rural setting north of Campbelltown. The site is characterised by undulating to low rolling hills on Wianamatta Group shales with Tertiary terraces occurring along the lower reaches of Cottage Creek. The vegetation is dominated by Cumberland Plain woodland, with small bands of alluvial forest and woodland along the watercourses, such as Cottage Creek. Much of the remnant woodland is degraded due to African Olive *Olea europaea* subspecies *cuspidata* infestation, grazing by cattle and horses and associated erosion. This site is not linked by continuous vegetation with any conservation reserves within the Campbelltown and surrounding LGAs. The site almost entirely comprises two priority fauna habitats in the form of grassy woodland and alluvial forest and woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Fauna present is characteristic of grassy woodlands, although relatively low in diversity due to heavy infestations of African Olive in some sections and the site’s isolation from conservation reserves.



Hollow-nesting species are generally in low abundance within the site, such as the Galah. M. Schulz



The remains of a Grey-headed Flying-fox entangled in a barbed wire fence in the site. M. Schulz/DECC



The Striped Marsh Frog is a common frog in wetland areas within the site. M. Schulz

Priority Fauna Species Review:

There have been 99 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 69 birds, 15 mammals, eight reptiles and seven frogs. Of these five species are considered vulnerable (discussed below). A further eight are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Private	Forages in the site when suitable trees and shrubs are in flower or fruit. One found entangled on a barbed wire fence on the edge of a dam in Aug 2007. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat	Vulnerable	1999 (Atlas record)	Private	One detected using Anabat in the Varroville area, south of St James Road in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.
Eastern Bentwing-bat	Vulnerable	1999 (Atlas record)	Private	Detected in the Scenic Hills Riding Ranch area in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. No known roosts within the site.
Southern Myotis	Vulnerable	1999 (Atlas record)	Private	Detected in a gully upstream of a large dam in the Scenic Hills Riding Ranch area in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. No known roosts within the site.
Greater Broad-nosed Bat	Vulnerable	1999 (Atlas record)	Private	A number detected using Anabat in the Varroville area, south of St James Road in Mar 1999 (Atlas of NSW Wildlife record). Likely to forage widely across the site. Also likely to roost in tree hollows within the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Habitat loss; weed infestation (particularly the African Olive); trampling and grazing by cattle and horses; barbed wire fence entanglement (for the Grey-headed Flying-fox); loss of remaining hollow-bearing trees.

Moderate: Predation by feral predators (such as the Fox and Feral Cat); impacts of Rabbit grazing; competition for hollows by feral Honeybees *Apis mellifera*; erosion; rubbish dumping.



An African Olive infested hillside within the site. M. Schulz/DECC



The lower sections of all major creeks on the southern edge of the site have been dammed. M. Schulz/DECC



The majority of the vegetation in the Denham Court-Varroville area has been cleared for grazing. M. Schulz/DECC

Land Management:

This site is entirely under private ownership.

References and Further Reading:

Campbelltown City Council (2003, 2004), Keith (2004), NSW National Parks and Wildlife Service (2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey; +2 – Atlas of NSW Wildlife.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Smooth Toadlet <i>Uperoleia laevisgata</i>	+1	P	RS
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+2	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+2	P	RS
Jacky Lashtail <i>Amphibolurus muricatus</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+2	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+2	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+2	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+2	P	

Species	Status	Legal Status	Regional Status
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+2	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+2	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+2	P	
Weebill <i>Smicronis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	+2	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+2	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+2	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+2	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+2	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Fuscou Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Brown-headed Honeyeater <i>Melithreptus brevirostris</i>	+2	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+2	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+2	P	
Jacky Winter <i>Microeca fascinans</i>	+2	P	RS
Eastern Yellow Robin <i>Eopsaltria australis</i>	+2	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+2	P	
Crested Shrike-tit <i>Falcunculus frontatus</i>	+2	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+2	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+2	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	

Species	Status	Legal Status	Regional Status
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Double-barred Finch <i>Taeniopygia bichenovii</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+2	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+2	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereve <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+2	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Sugar Glider <i>Petaurus breviceps</i>	+2	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+2	P	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+2	V	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+2	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+2	V	
Southern Myotis <i>Myotis macropus</i>	+2	V	
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+2	P	RS
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	+2	V	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 45: ALLENBY PARK

Location:

Allenby Park in the suburbs of Allambie Heights, Beacon Hill and Brookvale (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Northern Beaches

Local Government Area:

Warringah

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	41	70
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	18	30
Total	59	100

Environmental Setting:



View from Allenby Park towards the coast; note heathland in foreground. M. Schulz/DECC



Coachwood/Forest Oak rainforest along Brookvale Creek. M. Schulz/DECC



Sydney Peppermint dominated woodland is a common vegetation community within Allenby Park. M. Schulz/DECC

The site comprises remnant bushland confined largely to steep valley slopes adjoining two arms of Brookvale Creek. The vegetation is characteristic of the slopes and smaller watercourses on Hawkesbury Sandstone, such as Sydney Sandstone Gully Forest and Sydney Sandstone Ridgetop Woodland (Keith 2004). Of particular interest is the Forest Oak *Allocasuarina torulosa*/Coachwood *Ceratopetalum apetalum* dominated rainforest along the lower reaches of Brookvale Creek; patches of Forest Oak open forest on lower slopes in the eastern part of the site; and areas of Coastal Sandstone Heath on the ridges and slopes. Professional and volunteer bush regenerators have been working in the site since 1990 (Warringah Council 2007). The site is not directly linked by continuous vegetation to other conservation reserves within the area (Warringah Council 2005b). The site supports two priority fauna habitats: rainforest and heathland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Little Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Few	<i>Further Significant Fauna:</i>	High

Fauna Overview: This site supports fauna typical of Hawkesbury Sandstone vegetation communities on the northern side of Sydney Harbour; of particular note is the presence of the threatened Powerful Owl, Red-crowned Toadlet, Eastern and Little Bentwing-bats.



Roosting Eastern Bentwing-bats in enclosed section of Brookvale Creek on the eastern edge of Allenby Park. M. Schulz/DECC



Sulphur-crested Cockatoos are a common bird within Allenby Park. M. Schulz/DECC



A small colony of Red-crowned Toadlets occurs within Allenby Park. M. Schulz

Priority Fauna Species Review:

There have been 66 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 45 birds, 11 mammals, eight reptiles, and two frogs. Of these five are considered vulnerable (these are discussed below). A further three are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Red-crowned Toadlet	Vulnerable	2007 (Current study)	Warringah Council	A minimum of five individuals calling from base of a low rock face on the north side of Brookvale Creek downstream of the main falls in Aug 2007 (Current study). Likely to be present in other parts of the site.
Powerful Owl	Vulnerable	2007 (Current study)	Warringah Council	Single roosting male located in a gully on Brookvale Creek east of Kokoda Crescent in Aug 2007 (Current study). Also recorded roosting in gully vegetation elsewhere in the eastern section of the site (J. Powell, Warringah Council, pers comm.; Atlas of NSW Wildlife records). Also known to nest in the site (J. Powell, Warringah Council, pers comm.). An individual observed in July 2007 in the Warringah Mall may have originated from this site.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages widely across the site when suitable trees and shrubs are in flower, such as the Red Bloodwood <i>Corymbia gummifera</i> . No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost (Sydney Water, Warringah Council)	280+ individuals were located roosting in the concrete-lined underground section of Brookvale Creek running south-east of the site in Aug 2007 (Current study). This total included three banded individuals. It is likely that foraging individuals range widely across the site.
Little Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Sydney Water, Warringah Council	At least one individual was located roosting amongst Eastern Bentwing-bats in the concrete-lined underground section of Brookvale Creek running south-east of the site in Aug 2007 (Current study). Foraging individuals may range widely across the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Cave-dwelling bat roost located in underground section of Brookvale Creek on the eastern boundary of the site.

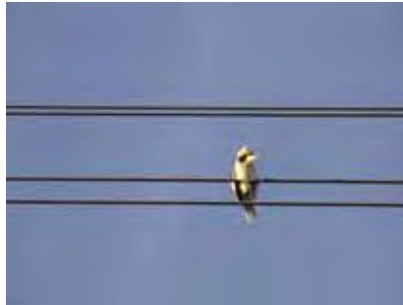
Identified Threats to Fauna Values:

High: Fire frequency and intensity; water quality associated with stormwater runoff; weed infestation; disturbance to bats roosting in enclosed section of Brookvale Creek, including the erection of incorrect gating resulting in roost abandonment (refer to Gration 2006, Thomson 2002).

Moderate: Housing encroachment on to fringing bushland areas; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Fox); competition for hollows by feral Honeybees *Apis mellifera*; impacts associated with easements; rubbish dumping; tree removal and poisoning.



Recently burnt heathland, Allenby Park. M. Schulz/DECC



High voltage powerlines traverse Allenby Park. M. Schulz/DECC



Inappropriate management of the Eastern Bentwing-bat roost may result in abandonment of the site. M. Schulz/DECC

Land Management:

The majority of the site comprises Allenby Park, a Warringah Council reserve. The site also includes small parcels of private land bordering the reserve, particularly on the southern edge of the area.

References and Further Reading:

Ecological Australia (2006), Gration (2006), Keith (2004), LandArc (2000), Warringah Council (2005a, b, c; 2007), Thomson (2002).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Red-crowned Toadlet <i>Pseudophryne australis</i>	+1	V	
Reptiles:			
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+1	P	
Copper-tailed Skink <i>Ctenotus taeniolatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Yellow-faced Whip Snake <i>Demansia psammophis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Birds:			
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Painted Button-quail <i>Turnix varia</i>	+1	P	RS
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Southern Boobook <i>Ninox boobook</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Variiegated Fairy-wren <i>Malurus lamberti</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	

Species	Status	Legal Status	Regional Status
Mammals:			
Unidentified Bandicoot sp.	+1	P	RS
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Little Bentwing-bat <i>Miniopterus australis</i>	+1	V	
House Mouse <i>Mus musculus</i>	+4	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	

Site 46: WOLLI CREEK

Location:

Wolli Creek from Bexley Road downstream to the Cooks River junction (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Cooks River

Local Government Area:

Canterbury and Rockdale

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	13	20
Crown Land	6	10
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	45	70
Total	64	100

Environmental Setting:



Remnant woodland, Girrahween Reserve. M. Schulz/DECC



Non-tidal reach of Wolli Creek. M. Schulz/DECC



Tidal section of Wolli Creek. M. Schulz/DECC

A linear corridor of remnant bushland and open space with a high edge effect in inner south west Sydney bordered by the East Hills Railway Line, industrial and residential land. Wolli Creek is tidal in the lower reaches, where it is bordered by mangroves and associated saltmarsh. Further upstream it is heavily infested with weeds due to nutrient enrichment, sediment loadings and the uncontrolled nature of material transported by the creek (Clouston 2004). Upslope vegetation is dominated by dry sclerophyll forest associated with the Hawkesbury Sandstone, with a small patch of closed forest dominated by Coachwood *Ceratopetalum apetalum* and Water Gum *Tristaniopsis laurina*. Much of the vegetation present has regenerated from former land uses, such as market gardening, grazing, poultry and pig farming (Madden & Muir 1996). It is not connected with any conservation reserves within the local region. The site supports four priority fauna habitats: forested wetland, rainforest, freshwater wetland and saltwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Moderate	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Moderate

Fauna Overview: Important diversity of fauna in a natural to semi-natural setting within an inner city environment supporting species that are rare elsewhere within inner Sydney.



Eastern Long-necked Turtles occur in the non-tidal sections of Wolli Creek. M. Schulz



Buff-banded Rail, a regionally significant species that occurs within the site. M. Schulz



A Grey-headed Flying-fox flying in at dusk to forage within the site. M. Schulz/DECC

Priority Fauna Species Review:

There have been 143 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 114 birds, 13 reptiles, 11 mammals and five frogs. Of these two species are considered vulnerable (discussed below). A further 13 are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Australasian Bittern	Vulnerable	2000 (Rankin 2006)	City of Canterbury	Very rare visitor: one recent record from Turella Reserve in Mar 2000 (Rankin 2006).
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	There is one small Grey-headed Flying-fox camp located in the site on the south side of Wolli Creek at Turella with approximately 200 to 300 individuals present in May (A. Smith, University of Technology Sydney, unpublished data). Numbers at this site increased to 5500 in Mar 2008 (B. Khan, DECC, pers. comm.). This site is difficult to access by the public and therefore the bats are little disturbed. As a result the number of individuals using this area may increase in future years. Additionally there is a small camp of between 20 and 40 individuals at the back of S. J. Harrison Reserve in Earlwood just to the west of the site (A. Smith, University of Technology Sydney, unpublished data). This bat is likely to forage on species such as the Swamp Mahogany present in the site.
**Little Tern	Endangered	1950s (Rankin 2006)	Unknown	No recent records. Early records, with a maximum of 15 individuals recorded (Rankin 2006).

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: One small recently established camp of the Grey-headed Flying-fox (also an additional small camp less than 1km to the west of the site in Earlwood); tidal shoreline occasionally used by small numbers of migratory shorebirds.

Identified Threats to Fauna Values:

High: Lack of connectivity to other sites supporting remnant habitat; weed infestation; impacts associated with a high edge effect, such as predation by domestic cats and encroachment of adjacent urban and industrial land; water quality.

Moderate: Disturbance due to high levels of public visitation; predation by feral species (such as the Black Rat, Brown Rat, Fox, Feral Dog and Feral Cat); disturbance by uncontrolled domestic dogs; rubbish dumping; illegal wildlife collection; entanglement in discarded fishing tackle (estuarine section).



A narrow habitat remnant within inner Sydney. M. Schulz/DECC



Heavy weed infestation along the non-tidal section of Wolli Creek. M. Schulz/DECC



Poor habitat link with the Cooks River, lower Wolli Creek. M. Schulz/DECC

Land Management:

The tenure of this site is complex, including a number of government agencies (e.g. DECC) and local councils managing the majority of the land. Any work within this area will require a cooperative approach to manage the site for fauna.

References and Further Reading:

Australian Museum Business Services (2007), Clouston Associates (2004), Keith (2004), Madden & Muir (1996), Morgan (1994), Rankin (2006).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Rankin (2006); +5 – Australian Museum Business Services (2007); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 - only recorded prior to 1997 (Rankin 2006).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+2	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Eastern Dwarf Tree Frog <i>Litoria fallax</i>	+2	P	
Peron's Tree Frog <i>Litoria peronii</i>	+2	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+2	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	

Species	Status	Legal Status	Regional Status
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+2	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+2	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+2	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+4	P	RS
Black Swan <i>Cygnus atratus</i>	*1	P	
Muscovy Duck <i>Cairina moschata</i>	+4	U	
Australian Wood Duck <i>Chenonetta jubata</i>	+4	P	
Mallard <i>Anas platyrhynchos</i>	+4	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+2	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	*1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+4	P	
Hoary-headed Grebe <i>Poliiocephalus poliocephalus</i>	*1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Little Egret <i>Egretta garzetta</i>	*1	P	
White-necked Heron <i>Ardea pacifica</i>	+2	P	
Great Egret <i>Ardea alba</i>	+1	P	RS
Intermediate Egret <i>Ardea intermedia</i>	*1	P	
Cattle Egret <i>Ardea ibis</i>	+3	P	
Striated Heron <i>Butorides striatus</i>	+1	P	
Nankeen Night Heron <i>Nycticorax caledonicus</i>	*1	P	RS
Australasian Bittern <i>Botaurus poiciloptilus</i>	+4	V	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Straw-necked Ibis <i>Threskiornis spinicollis</i>	+4	P	
Royal Spoonbill <i>Platalea regia</i>	+4	P	
Yellow-billed Spoonbill <i>Platalea flavipes</i>	*1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Whistling Kite <i>Haliastur sphenurus</i>	*1	P	RS
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	*1	P	RS
Swamp Harrier <i>Circus approximans</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Grey Goshawk <i>Accipiter novaehollandiae</i>	+4	P	RS
Collared Sparrowhawk <i>Accipiter cirrocephalus</i>	*1	P	
Wedge-tailed Eagle <i>Aquila audax</i>	*1	P	RS

Species	Status	Legal Status	Regional Status
Little Eagle <i>Hieraaetus morphnoides</i>	*1	P	RS
Brown Falcon <i>Falco berigora</i>	*1	P	
Australian Hobby <i>Falco longipennis</i>	+4	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Nankeen Kestrel <i>Falco cenchroides</i>	+1	P	
Buff-banded Rail <i>Gallirallus philippensis</i>	*1	P	RS
Baillon's Crake <i>Porzana pusilla</i>	*1	P	RS
Spotless Crake <i>Porzana tabuensis</i>	+4	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	*1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	*1	P	RS
Bar-tailed Godwit <i>Limosa lapponica</i>	*1	P	RS
Common Greenshank <i>Tringa nebularia</i>	*1	P	RS
Common Sandpiper <i>Actitis hypoleucos</i>	+1	P	RS
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	*1	P	RS
Curlew Sandpiper <i>Calidris ferruginea</i>	*1	P	RS
Black-winged Stilt <i>Himantopus himantopus</i>	*4	P	
Pacific Golden Plover <i>Pluvialis fulva</i>	*1	P	RS
Black-fronted Dotterel <i>Euseyonis melanops</i>	*1	P	
Banded Lapwing <i>Vanellus tricolor</i>	*1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+4	P	
Little Tern <i>Sterna albifrons</i>	*1	E1	
Common Tern <i>Sterna hirundo</i>	*1	P	RS
Whiskered Tern <i>Chlidonias hybridus</i>	*1	P	RS
Rock Dove <i>Columba livia</i>	+1	U	
White-headed Pigeon <i>Columba leucomela</i>	*1	P	
Brown Cuckoo-Dove <i>Macropygia amboinensis</i>	*1	P	RS
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Peaceful Dove <i>Geopelia placida</i>	*1	P	RS
Topknot Pigeon <i>Lopholaimus antarcticus</i>	*1	P	RS
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+2	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Cockatiel <i>Nymphicus hollandicus</i>	+4	P	Escapee?
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chlorolepidotus</i>	+4	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	*1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	*1	P	

Species	Status	Legal Status	Regional Status
Blue-winged Parrot <i>Neophema chrysostoma</i>	*1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	+4	P	
Brush Cuckoo <i>Cacomantis variolosus</i>	*1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Horsfield's Bronze-Cuckoo <i>Chalcites basalus</i>	+2	P	
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	+4	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+4	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Barn Owl <i>Tyto alba</i>	*1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+2	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+1	P	
Fork-tailed Swift <i>Apus pacificus</i>	*1	P	
Azure Kingfisher <i>Alcedo azurea</i>	+4	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	+1	P	
Dollarbird <i>Eurystomus orientalis</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	*1	P	
Yellow-throated Scrubwren <i>Sericornis citreogularis</i>	*1	P	RS
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	*1	P	
White-throated Gerygone <i>Gerygone olivacea</i>	*1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+2	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	*1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Friarbird <i>Philemon corniculatus</i>	*1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+2	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	*1	P	RS
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	*1	P	
Brown Honeyeater <i>Lichmera indistincta</i>	*1	P	RS
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+4	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Scarlet Honeyeater <i>Myzomela sanguinolenta</i>	+4	P	
White-fronted Chat <i>Epthianura albifrons</i>	*1	P	RS
Jacky Winter <i>Microeca fascians</i>	*1	P	RS
Scarlet Robin <i>Petroica multicolor</i>	*1	P	RS
Rose Robin <i>Petroica rosea</i>	+4	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Whipbird <i>Psophodes olivaceus</i>	*1	P	
Eastern Shrike-tit <i>Falcunculus frontatus</i>	*1	P	RS
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	*1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	*1	P	
Black-faced Monarch <i>Monarcha melanopsis</i>	*1	P	
Leaden Flycatcher <i>Myiagra rubecula</i>	*1	P	
Satin Flycatcher <i>Myiagra cyanoleuca</i>	+3	P	
Restless Flycatcher <i>Myiagra inquieta</i>	*1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Rufous Fantail <i>Rhipidura rufifrons</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	*1	P	RS
White-winged Triller <i>Lalage tricolor</i>	*1	P	RS
Olive-backed Oriole <i>Oriolus sagittatus</i>	+2	P	
Australasian Figbird <i>Sphecotheres vieilloti</i>	+4	P	
Masked Woodswallow <i>Artamus personatus</i>	*1	P	
White-browed Woodswallow <i>Artamus superciliosus</i>	*1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Grey Currawong <i>Strepera versicolor</i>	*1	P	RS
Australian Raven <i>Corvus coronoides</i>	+1	P	
Eurasian Skylark <i>Alauda arvensis</i>	*1	U	
Australian Pipit <i>Anthus australis</i>	+4	P	RS
House Sparrow <i>Passer domesticus</i>	+2	U	
Zebra Finch <i>Taeniopygia guttata</i>	*1	P	RS
Double-barred Finch <i>Taeniopygia bichenovii</i>	+4	P	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Nutmeg Mannikin <i>Lonchura punctulata</i>	+4	U	
Chestnut-breasted Mannikin <i>Lonchura castaneothorax</i>	*1	P	RS
European Greenfinch <i>Carduelis chloris</i>	*1	U	
European Goldfinch <i>Carduelis carduelis</i>	+4	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
White-backed Swallow <i>Cheramoeca leucosternus</i>	*1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Tree Martin <i>Petrochelidon nigricans</i>	+4	P	
Fairy Martin <i>Petrochelidon ariel</i>	+4	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+1	P	
Tawny Grassbird <i>Megalurus timoriensis</i>	+1	P	RS
Little Grassbird <i>Megalurus gramineus</i>	+4	P	RS

Species	Status	Legal Status	Regional Status
Golden-headed Cisticola <i>Cisticola exilis</i>	+1	P	RS
Silveryeye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+2	P	
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+2	P	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Brown Rat <i>Rattus norvegicus</i>	+5	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+1	U	

Site 47: CURL CURL LAGOON

Location:

Curl Curl Lagoon and Greendale Creek upstream to Harbord Road (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Northern Beaches

Local Government Area:

Warringah

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	14	64
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	8	36
Total	22	100

Environmental Setting:



Common Reeds lining Curl Curl Lagoon. M. Schulz/DECC



Curl Curl Lagoon upstream from Curl Curl Beach. M. Schulz/DECC



Swamp Oak forest stand, Curl Curl Lagoon. M. Schulz/DECC

Curl Curl Lagoon is a small coastal lake that is in an extensively modified condition (NSW Department of Natural Resources 2007) that was once part of an ancient north-south river system formed during the Tertiary era (Taylor 1958). Water quality is poor resulting from stormwater runoff from surrounding urban and industrial areas. The lagoon is regularly closed and breakout either occurs naturally as a result of wave action or water overtopping and scouring the sandbar or through mechanical opening. The lagoon is bordered by a narrow band of natural vegetation backed primarily by playing fields and extensive mowed parkland. Remnant natural vegetation around Curl Curl Lagoon includes two endangered ecological communities listed under the TSC Act 1995: Sydney Freshwater Wetlands dominated by Common Reed *Phragmites australis* and Swamp Oak *Casuarina glauca* Floodplain Forest (Warringah Council 2005a). Greendale Creek is bordered by a narrow band of Common Reed fringing native plantings with a mowed ground layer backed by extensive playing fields. A large amount of bush regenerating has been undertaken resulting in only limited areas having a shrubby understorey which has resulted in a further reduction of fauna diversity, such as reptiles and small understorey birds. Curl Curl Lagoon is not directly linked by continuous vegetation to other conservation reserves within the area (Warringah Council 2005b). Disturbance to wildlife is high due to the narrow width of remnant vegetation, heavy public usage and the area being used as an exercise area for dogs off leash. The site supports two priority fauna habitats: forested wetland and freshwater wetland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Highly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: This site supports a depauperate assemblage of fauna associated with a highly modified, disturbed and polluted wetland and highly modified fringing vegetation, although uncommon species within the CMA occasionally occur such as the Red-necked Avocet.



Curl Curl Lagoon is primarily used by regionally common waterbird species, such as the Eurasian Coot. M. Schulz



Curl Curl Lagoon mouth is very rarely used by migratory shorebirds. M. Schulz/DECC



Extensive bush regeneration activities has resulted in the loss of understorey habitat which threatens some species such as the Superb Fairy-wren. M. Schulz

Priority Fauna Species Review:

There have been 89 vertebrate fauna species (excluding fish and marine species) documented within this area in the last 10 years: 80 birds, six mammals, two reptiles and one frog. Of these two are considered vulnerable (see below). A further eight species are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat	Forages widely across the site when suitable trees and shrubs are in flower or fruit. For example in Aug 2007 individuals were observed feeding in flowering Coast Banksia <i>Banksia integrifolia</i> (Current study). There are no known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat	Recorded foraging over and on the edge of Curl Curl Lagoon in Aug 2007 (Current study). There are no known roosts in the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Occasionally used the by small numbers of migratory shorebirds (i.e. Latham’s Snipe).

Identified Threats to Fauna Values:

High: Water quality; no habitat link with remnant vegetation in adjacent reserves; mowing under stands of trees that prevents regeneration and the development of native shrubs and ground layer vegetation; disturbance to wildlife by uncontrolled domestic dogs and widespread access along the lagoon.

Moderate: Bush regeneration activities resulting in the removal of shrubby weeds such as Lantana *Lantana camara* that may result in the loss of species requiring dense cover, such as the White-browed Scrubwren and Superb Fairy-wren; predation by feral predators (such as the Fox); entanglement in discarded fishing tackle; rubbish dumping.



The polluted waters of Curl Curl Lagoon are likely to impact on fauna using the site, particularly waterbirds. M. Schulz/DECC



Vegetation fringing Curl Curl Lagoon is typically highly modified and narrow, backed by playing fields and mowed grass areas. M. Schulz/DECC



The catchment of the lagoon consists of urban and industrial lands. M. Schulz/DECC

Land Management:

The site comprises land managed by Warringah Council, including sections of John Fisher Park and Flora & Ritchie Roberts Reserve.

References and Further Reading:

Keith (2004), Department of Natural Resources (2007), Taylor (1958), Warringah Council (2001, 2002b, 2005a, b, c).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – C. Gallery, DECC, pers. comm.; +5 – B. Cox, local bird watcher, pers. comm.; * - only recorded prior to 1997 (Atlas of NSW Wildlife records).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Reptiles:			
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Birds:			
Brown Quail <i>Coturnix ypilophora</i>	+5	P	RS
Black Swan <i>Cygnus atratus</i>	+4	P	
Australian Wood Duck <i>Chenonetta jubata</i>	+5	P	
Mallard <i>Anas platyrhynchos</i>	+1	U	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Grey Teal <i>Anas gracilis</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Hardhead <i>Aythya australis</i>	+1	P	
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
Pied Cormorant <i>Phalacrocorax varius</i>	+1	P	
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	+1	P	
Great Cormorant <i>Phalacrocorax carbo</i>	+1	P	
Australian Pelican <i>Pelecanus conspicillatus</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Reef Egret <i>Egretta sacra</i>	+5	P	RS
Great Egret <i>Ardea alba</i>	+1	P	RS
Cattle Egret <i>Ardea ibis</i>	+5	P	
Royal Spoonbill <i>Platalea regia</i>	+5	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Black-shouldered Kite <i>Elanus axillaris</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Purple Swamphen <i>Porphyrio porphyrio</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Eurasian Coot <i>Fulica atra</i>	+1	P	
Latham's Snipe <i>Gallinago hardwickii</i>	+5	P	RS
Red-necked Avocet <i>Recurvirostra novaehollandiae</i>	+2	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Silver Gull <i>Larus novaehollandiae</i>	+1	P	
Crested Tern <i>Sterna bergii</i>	+1	P	
Caspian Tern <i>Sterna caspia</i>	+2	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>	+5	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Long-billed Corella <i>Cacatua tenuirostris</i>	+5	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+2	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+5	P	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	+5	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+5	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	+5	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+5	P	
White-cheeked Honeyeater <i>Phylidonyris nigra</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	

Species	Status	Legal Status	Regional Status
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Figbird <i>Sphecotheres vieilloti</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	+5	P	RS
House Sparrow <i>Passer domesticus</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	+2	P	
Golden-headed Cisticola <i>Cisticola exilis</i>	+5	P	RS
Silvereye <i>Zosterops lateralis</i>	+1	P	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 48: QUARRY BRANCH CREEK

Location:

Quarry Branch Creek and fringing remnant vegetation from the M2 Motorway downstream to the Toongabbie Creek confluence and Toongabbie Creek from Third Settlement Reserve downstream to the Cumberland Highway, in the Upper Parramatta River catchment (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Parramatta River

Local Government Area:

Parramatta

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	6	10
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	58	90
Total	64	100

Environmental Setting:



Remnant vegetation fringing Quarry Branch Creek. M. Schulz/DECC



Turpentine along Quarry Branch Creek, Moxhams Reserve. M. Schulz/DECC



Stand of Sydney Blue Gums, Toongabbie Creek. M. Schulz/DECC

Quarry Branch and Toongabbie Creeks are modified watercourses within the Upper Parramatta River catchment. This site comprises a narrow band of remnant vegetation within a highly urbanised/industrial setting. Both Quarry Branch and Toongabbie Creeks are subject to poor water quality as a result of stormwater and industrial runoff. Fringing vegetation varies from widespread woodland communities associated with Hawkesbury Sandstone to vegetation communities that are now rare within the CMA and listed as endangered ecological communities, such as Blue Gum *Eucalyptus saligna* High Forest in the Sydney Basin Bioregion and Sydney Turpentine *Syncarpia glomulifera* - Ironbark Forest. The former community is poorly represented in conservation reserves, and within this site primarily occurs on Wianamatta Group Shales, particularly along Toongabbie Creek. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*. Sections of the site have been subjected to intensive bush regeneration activities. However, broadscale clearance of weeds in some areas must be carefully considered, as without alternative cover such activities may result in a further reduction of fauna diversity, such as reptiles and small understorey birds. The site supports no priority fauna habitats.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Little Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Moderately Modified
<i>Priority Fauna Habitat:</i>	Nil	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: The fauna present is typical of a highly modified environment within an urban setting; although of interest are the presence of a number of threatened species, such as the Powerful Owl, Eastern Bentwing-bat and Southern Myotis.



Southern Myotis and Eastern Bentwing-bat roost, Hammers Road bridge. M. Schulz/DECC



The most prevalent arboreal mammal is the Common Ringtail Possum. N. Corkish



The Brown Thornbill is a common small native bird within the site. M. Schulz

Priority Fauna Species Review:

There have been 89 vertebrate fauna species (excluding fish and escapees) documented within this area in the last 10 years: 64 birds, 13 reptiles, 10 mammals and two frogs. Of these four are considered vulnerable (these are discussed below). A further three are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Powerful Owl	Vulnerable	2007 (Current study)	Parramatta Council	A male heard calling in early Aug 2007 prior to dusk along Quarry Branch Creek between Moxhams Road and Churchill Drive could suggest that the species is nesting in the area (Current study).
**Brown Treecreeper	Vulnerable	1924-34 (Quersted 2004)	Unknown	Recorded from Wentworthville between 1924 and 1934 (Quersted 2004). Now extinct in the area.
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Parramatta Council, RTA	Two individuals were located roosting in a dark concrete alcove in Hammers Road bridge in Aug 2007 (Current study). It is likely that foraging individuals range widely across the site.
Southern Myotis	Vulnerable	2007 (Current study)	Widespread foraging habitat; roost: Parramatta Council, RTA	Four individuals were located roosting in the same alcove as the Eastern Bentwing-bats in the Hammers Road bridge in Aug 2007 (Current study). It is likely that foraging individuals range widely along watercourses within the site.

* As listed under TSC Act 1995; ** Only recorded prior to 1997.

Additional Faunal Values: Small cave-dwelling bat roost located in enclosed section of Hammers Road bridge.

Identified Threats to Fauna Values:

High: Limited habitat link with other conservation reserves within the Parramatta area; water quality, particularly stormwater run off; weed infestation; housing encroachment on to fringing bushland areas tree dieback.

Moderate: Bush regeneration activities resulting in the removal of shrubby weeds such as Lantana that may result in the loss of species requiring dense cover, such as the Eastern Whipbird; fire frequency and intensity; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Black Rat, Fox and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; impacts associated with easements and road crossings; tree removal and poisoning, rubbish dumping, particularly garden waste; bush rock removal.



Broad-scale bush regeneration without alternative cover available may result in the loss of some native species from the site. M. Schulz/DECC



Dieback of eucalypts within the area is likely to impact on the long-term faunal diversity of the site. M. Schulz/DECC



The southern section of the site comprises scattered remnant Sydney Blue Gums in a park-like landscape. M. Schulz/DECC

Land Management:

Remnant vegetation fringing Quarry Branch and Toongabbie Creeks is primarily managed by Parramatta City Council as a series of reserves, including Model Farms Reserve, Moxham Park, John Curtin Reserve, Whitehaven Park, Otto Losco Reserve, Third Settlement Reserve, Robin Hood Park and Armagh Park. A section of the site on the northern junction of the two creeks comprises the Bundilla Scout Camp. The site is bordered by urban and industrial land. There are a number of roads and easements bisecting the site managed by a variety of government agencies, such as Sydney Water and the RTA.

References and Further Reading:

EarthTech (2007), Keith (2004), Parramatta City Council (2002, 2003), Quested (2004).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website; +4 – Parramatta City Council (2003); * - only recorded prior to 1997 (Atlas of NSW Wildlife records); *1 - only recorded prior to 1997 (Quested 2004).

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Peron’s Tree Frog <i>Litoria peronii</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Broad-tailed Gecko <i>Phyllurus platurus</i>	+1	P	
Eastern Water Dragon <i>Physignathus lesueurii</i>	+1	P	
Red-throated Cool-skink <i>Acritoscincus platynota</i>	+4	P	
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+4	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Blackish Blind Snake <i>Ramphotyphlops nigrescens</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Chestnut Teal <i>Anas castanea</i>	+1	P	
Darter <i>Anhinga melanogaster</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	+2	P	RS
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Brown Falcon <i>Falco berigora</i>	*1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Red-kneed Dotterel <i>Erythrogonys cinctus</i>	*1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Topknot Pigeon <i>Lopholaimus antarcticus</i>	+1	P	RS
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Pallid Cuckoo <i>Cuculus pallidus</i>	*1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+2	P	
Southern Boobook <i>Ninox boobook</i>	*1	P	
Powerful Owl <i>Ninox strenua</i>	+1	V	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Azure Kingfisher <i>Alcedo azurea</i>	*1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Sacred Kingfisher <i>Todiramphus sanctus</i>	*1	P	
Dollarbird <i>Eurystomus orientalis</i>	+4	P	
White-throated Treecreeper <i>Cormobates leucophaeus</i>	*1	P	
Brown Treecreeper <i>Climacteris picumnus</i>	*1	V	Locally Extinct
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	

Species	Status	Legal Status	Regional Status
Striated Pardalote <i>Pardalotus striatus</i>	*1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
Brown Thornbill <i>Acanthiza pusilla</i>	+1	P	
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	*1	P	RS
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+4	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Little Wattlebird <i>Anthochaera chrysoptera</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
New Holland Honeyeater <i>Phylidonyris novaehollandiae</i>	+1	P	
Eastern Spinebill <i>Acanthorhynchus tenuirostris</i>	+1	P	
Jacky Winter <i>Microeca fascinans</i>	*1	P	RS
Scarlet Robin <i>Petroica multicolor</i>	*1	P	RS
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Eastern Whipbird <i>Psophodes olivaceus</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+4	P	
Restless Flycatcher <i>Myiagra inquieta</i>	*1	P	RS
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Spangled Drongo <i>Dicrurus bracteatus</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
White-browed Wood Swallow <i>Artamus superciliosus</i>	*1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	*1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Australian Pipit <i>Anthus australis</i>	*1	P	RS
House Sparrow <i>Passer domesticus</i>	*1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
European Goldfinch <i>Carduelis carduelis</i>	*1	U	
Mistletoebird <i>Dicaeum hirundinaceum</i>	*1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Fairy Martin <i>Petrochelidon ariel</i>	*1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Australian Reed-Warbler <i>Acrocephalus australis</i>	*1	P	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	

Species	Status	Legal Status	Regional Status
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	

Site 49: ST ANDREWS

Location:

Private land north and south of Upper Canal (Sydney Water Supply Channel) between St Andrews Road and Yarraville Reservoir (refer to Map iv).

Relative Area Size in CMA:

Small

Sub-catchment:

Georges River

Local Government Area:

Campbelltown

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	5	6
Other	78	94
Total	83	100

Environmental Setting:



Woodland dominated by ironbarks and Grey Box, St Andrews. M. Schulz/DECC



Alluvial woodland, St Andrews. M. Schulz, DECC



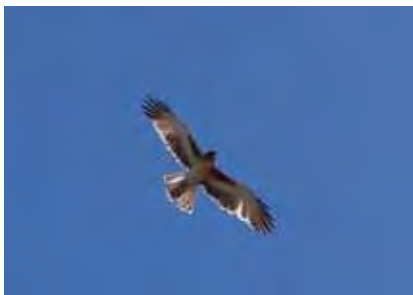
Remnant woodland in the site is bisected by a number of easements. M. Schulz/DECC

This site is situated within the Upper Georges River catchment. It is a remote location with little public road access situated within a largely rural setting north of Campbelltown. The site is characterised by undulating to low rolling hills on Wianamatta Group shales. The primary vegetation formation is Cumberland Plain woodland, with small bands of alluvial forest and woodland along the larger watercourses. Much of the remnant woodland is degraded due to African Olive *Olea europaea* subspecies *cuspidata* infestation, grazing by cattle and horses and associated erosion. This site is not linked by continuous vegetation with any conservation reserves within the Campbelltown and surrounding LGAs. The site almost entirely comprises two priority fauna habitats in the form of grassy woodland and alluvial forest and woodland.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Little Bisected
<i>Tree Hollows:</i>	Few	<i>Below Canopy Structure:</i>	Highly Modified
<i>Priority Fauna Habitat:</i>	High	<i>Future Prospects:</i>	Decrease
<i>Feral Birds:</i>	Moderate	<i>Further Significant Fauna:</i>	Very High

Fauna Overview: Fauna present is characteristic of grassy woodlands, although relatively low in diversity due to heavy infestations of African Olive and the site's isolation from conservation reserves.



Little Eagle, a regionally significant species occurs in the site. M. Schulz



Eastern Bearded Dragon, a declining species around Sydney. M. Schulz



Sugar Glider, a remnant population remains in the site. M. Schulz

Priority Fauna Species Review:

There have been 87 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 57 birds, 14 mammals, 11 reptiles and five frogs. Of these two species are considered vulnerable (excluding unconfirmed species; discussed below). A further eight are considered regionally significant species (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread	Forages in the site when suitable trees and shrubs are in flower or fruit. Two found entangled on barbwire fences in Apr 2007. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
East-coast Freetail-bat (UNCONFIRMED)	Vulnerable	2007 (Current study)	Widespread	Unconfirmed ultrasonic recordings using Anabat (Current study). Confirmed records of this bat in the nearby Denham Court site.
Eastern Bentwing-bat	Vulnerable	1999 (Atlas record)	Widespread	Recorded adjacent to the SCA water supply pipeline (Current study). Likely to forage widely across the site. No known roosts within the site.
Southern Myotis (UNCONFIRMED)	Vulnerable	2007 (Current study)	Crown: SCA	Unconfirmed ultrasonic recordings using Anabat (Current study). Confirmed records of this bat in the nearby Denham Court site.

* As listed under TSC Act 1995.
Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: Habitat loss; weed infestation (particularly the African Olive; barbwire fence entanglement (for the Grey-headed Flying-fox); loss of remaining hollow-bearing trees.

Moderate: Predation by feral predators (such as the Fox and Feral Cat); impacts of Rabbit grazing; competition for hollows by feral Honeybees *Apis mellifera*; trampling and grazing by cattle; erosion; small Feral Pig population; rubbish dumping.



Upper Canal bisects the woodland in this site. M. Schulz/DECC



Grassy woodland infested with African Olives. M. Schulz/DECC



Grey-headed Flying-fox entangled in a barbwire fence in the site. M. Schulz/DECC

Land Management:

This site is almost entirely under private ownership, with the exception of the Upper Canal corridor that is managed by Sydney Catchment Authority.

References and Further Reading:

Campbelltown City Council (2003, 2004), Keith (2004), NSW National Parks and Wildlife Service (2001d).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + - Recorded since 1997; +1 – Current survey.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Spotted Grass Frog <i>Limnodynastes tasmaniensis</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Verreaux's Tree Frog <i>Litoria verreauxii</i>	+1	P	
Reptiles:			
Jacky Lashtail <i>Amphibolurus muricatus</i>	+1	P	
Eastern Bearded Dragon <i>Pogona barbata</i>	+1	P	RS
Cream-striped Shinning Skink <i>Cryptoblepharus virgatus</i>	+1	P	
Robust Ctenotus <i>Ctenotus robustus</i>	+1	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Bar-sided Forest-skink <i>Eulamprus tenuis</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Common Bluetongue <i>Tiliqua scincoides</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+1	P	
Eastern Brown Snake <i>Pseudonaja textilis</i>	+1	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Little Eagle <i>Hieraaetus morphnoides</i>	+1	P	RS
Brown Falcon <i>Falco berigora</i>	+1	P	
Peregrine Falcon <i>Falco peregrinus</i>	+1	P	RS
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Bar-shouldered Dove <i>Geopelia humeralis</i>	+1	P	RS
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	

Species	Status	Legal Status	Regional Status
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
Striated Pardalote <i>Pardalotus striatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Weebill <i>Smicromnis brevirostris</i>	+1	P	RS
Brown Gerygone <i>Gerygone mouki</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Striated Thornbill <i>Acanthiza lineata</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Bell Miner <i>Manorina melanophrys</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Lewin's Honeyeater <i>Meliphaga lewinii</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
Fuscous Honeyeater <i>Lichenostomus fuscus</i>	+1	P	RS
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
Rose Robin <i>Petroica rosea</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Rufous Whistler <i>Pachycephala rufiventris</i>	+1	P	
Grey Shrike-thrush <i>Colluricincla harmonica</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Dusky Woodswallow <i>Artamus cyanopterus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	
Eurasian Skylark <i>Alauda arvensis</i>	+1	U	
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Mammals:			
Common Brushtail Possum <i>Trichosurus vulpecula</i>	+1	P	
Sugar Glider <i>Petaurus breviceps</i>	+1	P	
Swamp Wallaby <i>Wallabia bicolor</i>	+1	P	RS

Species	Status	Legal Status	Regional Status
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
East-coast Freetail-bat <i>Mormopterus norfolkensis</i>	+1	V	Unconfirmed
Chocolate Wattled Bat <i>Chalinolobus morio</i>	+1	P	
Little Forest Bat <i>Vespadelus vulturnus</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
Southern Myotis <i>Myotis macropus</i>	+1	V	Unconfirmed
Eastern Broad-nosed Bat <i>Scotorepens orion</i>	+1	P	RS
Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>	+1	P	
House Mouse <i>Mus musculus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	
Feral Pig <i>Sus scrofa</i>	+1	U	

Low Ranking Fauna Sites

A single site of remnant bushland greater than 50ha in area within the CMA was identified as having a low fauna ranking (Upper Toongabbie Creek). This site comprises a series of council reserves in a heavily urbanised region of western Sydney.



Map v: Native Vegetation Remnants with Low Fauna Significance:

Site 50: UPPER TOONGABBIE CREEK

Location:

Upper Toongabbie Creek and fringing remnant vegetation from Sierra Place Reserve upstream along three major tributaries to Merindah, Jasper and Windsor Roads, Baulkham Hills (refer to Map v).

Relative Area Size in CMA:

Small

Sub-catchment:

Parramatta River

Local Government Area:

Baulkham Hills

Tenure:

Tenure	Area (ha)	% of Site
DECC Reserves	0	0
Crown Land	0	0
Commonwealth Land	0	0
Remaining Public Land	0	0
Other	54	100
Total	54	100



Large Sydney Blue Gum upslope of Toongabbie Creek. M. Schulz/DECC



Remnant vegetation along Toongabbie Creek, Sophia Doyle Reserve. M. Schulz/DECC



Heavily modified vegetation along Toongabbie Creek downstream of the M2 Motorway. M. Schulz/DECC

Environmental Setting:

Upper Toongabbie Creek is situated within the Upper Parramatta River catchment. This site comprises a narrow band of remnant vegetation within a highly urbanised setting. Toongabbie Creek is subject to poor water quality as a result of stormwater runoff. Fringing vegetation varies from woodland communities associated with Minchinbury Sandstone to vegetation communities that are now rare within the CMA and listed as endangered ecological communities, such as Blue Gum *Eucalyptus saligna* High Forest in the Sydney Basin Bioregion and Sydney Turpentine *Syncarpia glomulifera*-Ironbark Forest. The former community is poorly represented in conservation reserves, and within this site primarily occurs on Wianamatta Group Shales. Vegetation ranges from little disturbed with remnant native shrub and ground layer species present to highly disturbed with extensive areas of weed infestation, such as Lantana *Lantana camara*. Significant amounts of tree dieback is evident in parts of the site, such as in the Sophia Doyle Reserve. Sections of the site have been subjected to intensive bush regeneration activities. This site is not linked by continuous vegetation with any conservation reserves within the Baulkham Hills and surrounding LGAs. The site supports no priority fauna habitats.

Habitat Assessment Criteria:

<i>Habitat Connectivity:</i>	Not Connected	<i>Habitat State:</i>	Highly Bisected
<i>Tree Hollows:</i>	Some	<i>Below Canopy Structure:</i>	Mostly Modified
<i>Priority Fauna Habitat:</i>	Nil	<i>Future Prospects:</i>	Little Change
<i>Feral Birds:</i>	Widespread	<i>Further Significant Fauna:</i>	High

Fauna Overview: The fauna present is typical of a small bushland remnant within an urban setting.



The Green Stream Frog is relatively common within the site. M. Schulz



The Weasel Shadeskink is common under logs and other ground debris upslope of Toongabbie Creek. M. Schulz



Dead stags within the site are used by a variety of species for nesting, such as the Little Corella. M. Schulz

Priority Fauna Species Review:

There have been 79 vertebrate fauna species (excluding fish) documented within this area in the last 10 years: 55 birds, 12 mammals, eight reptiles and four frogs. Of these two are considered vulnerable (discussed below). One regionally significant species has been documented to occur within the site (see species list).

Threatened Species Known to Occur:

Species	Threat Category*	Last Recorded	Tenure	Comments
Grey-headed Flying-fox	Vulnerable	2007 (Current study)	Widespread foraging habitat	Forages widely across the site when suitable trees and shrubs are in flower or fruit. No known camps in the area (P. Eby, flying-fox consultant, pers. comm.).
Eastern Bentwing-bat	Vulnerable	2007 (Current study)	Widespread foraging habitat	Foraging individuals recorded in a number of locations in Aug 2007 (Current study). No documented roosts within the site.

* As listed under TSC Act 1995.

Additional Faunal Values: Nil.

Identified Threats to Fauna Values:

High: No habitat link with other conservation reserves within the Baulkham Hills and surrounding LGAs; water quality, particularly stormwater run off; weed infestation, tree dieback.

Moderate: Housing encroachment on to fringing bushland areas; disturbance by uncontrolled domestic dogs; predation by domestic cats; predation by feral predators (such as the Black Rat, Fox, Feral Dog and Feral Cat); competition for hollows by feral Honeybees *Apis mellifera*; impacts associated with easements and road crossings; tree removal and poisoning, rubbish dumping, particularly garden waste or deposited by flood waters along Toongabbie Creek.



Bush regeneration is actively being undertaken within parts of the site. M. Schulz/DECC



Contrasting environments: the remnant bushland of the site bordered by suburbia. M. Schulz/DECC



Sections of the site have tree dieback evident, such as parts of Sophia Doyle Reserve. M. Schulz/DECC

Land Management:

Remnant vegetation fringing Toongabbie Creek is primarily managed by Baulkham Hills Shire Council as a series of reserves, including Sierra Place Reserve, Col Sutton Park, William Joyce Reserve, Sophia Doyle Reserve and Torry Burn Reserve. A section of the site adjacent to the M2 Motorway is managed by the RTA. The site is bordered by urban land. There are a number of roads and easements bisecting the site managed by a variety of government agencies, such as Sydney Water and the RTA.

References and Further Reading:

Keith (2004), NSW National Parks and Wildlife Service (1997).

Area Species List:

Species order follows Cogger (1996) for amphibians and reptiles; Christidis & Boles (1994) for birds; and Menkhorst & Knight (2001) for mammals.

Status: + – Recorded since 1997; +1 - Current survey; +2 – Atlas of NSW Wildlife; +3 – Records from various observers posted on the Birding-aus website.

Legal/Regional Status: E1 – Endangered (under TSC Act 1995); V – Vulnerable (under TSC Act 1995); P – Protected (under NPWS Act 1974); U – Unprotected; RS – Regionally significant.

Species	Status	Legal Status	Regional Status
Amphibians:			
Common Eastern Froglet <i>Crinia signifera</i>	+1	P	
Striped Marsh Frog <i>Limnodynastes peronii</i>	+1	P	
Peron's Tree Frog <i>Litoria peronii</i>	+1	P	
Green Stream Frog <i>Litoria phyllochroa</i>	+1	P	
Reptiles:			
Eastern Long-necked Turtle <i>Chelodina longicollis</i>	+1	P	RS
Eastern Water Dragon <i>Physignathus lesueurii</i>	+2	P	
Eastern Water-skink <i>Eulamprus quoyii</i>	+1	P	
Dark-flecked Garden Sunskink <i>Lampropholis delicata</i>	+1	P	
Pale-flecked Garden Sunskink <i>Lampropholis guichenoti</i>	+1	P	
Yellow-bellied Three-toed Skink <i>Saiphos equalis</i>	+1	P	
Weasel Shadeskink <i>Saproscincus mustelinus</i>	+1	P	
Red-bellied Black Snake <i>Pseudechis porphyriacus</i>	+2	P	
Birds:			
Australian Wood Duck <i>Chenonetta jubata</i>	+1	P	
Pacific Black Duck <i>Anas superciliosa</i>	+1	P	
Little Pied Cormorant <i>Phalacrocorax melanoleucos</i>	+1	P	

Species	Status	Legal Status	Regional Status
White-faced Heron <i>Egretta novaehollandiae</i>	+1	P	
Australian White Ibis <i>Threskiornis molucca</i>	+1	P	
Brown Goshawk <i>Accipiter fasciatus</i>	+1	P	
Dusky Moorhen <i>Gallinula tenebrosa</i>	+1	P	
Masked Lapwing <i>Vanellus miles</i>	+1	P	
Rock Dove <i>Columba livia</i>	+1	U	
Spotted Turtle-Dove <i>Streptopelia chinensis</i>	+1	U	
Crested Pigeon <i>Ocyphaps lophotes</i>	+1	P	
Galah <i>Eolophus roseicapillus</i>	+1	P	
Little Corella <i>Cacatua pastinator</i>	+1	P	
Sulphur-crested Cockatoo <i>Cacatua galerita</i>	+1	P	
Rainbow Lorikeet <i>Trichoglossus haematodus</i>	+1	P	
Scaly-breasted Lorikeet <i>Trichoglossus chorolepidotus</i>	+2	P	
Musk Lorikeet <i>Glossopsitta concinna</i>	+1	P	
Australian King-Parrot <i>Alisterus scapularis</i>	+1	P	
Crimson Rosella <i>Platycercus elegans</i>	+1	P	
Eastern Rosella <i>Platycercus adscitus eximius</i>	+1	P	
Red-rumped Parrot <i>Psephotus haematonotus</i>	+1	P	
Fan-tailed Cuckoo <i>Cacomantis flabelliformis</i>	+1	P	
Pacific Koel <i>Eudynamys orientalis</i>	+1	P	
Southern Boobook <i>Ninox boobook</i>	+1	P	
Tawny Frogmouth <i>Podargus strigoides</i>	+1	P	
White-throated Needletail <i>Hirundapus caudacutus</i>	+3	P	
Laughing Kookaburra <i>Dacelo novaeguineae</i>	+1	P	
Superb Fairy-wren <i>Malurus cyaneus</i>	+1	P	
Spotted Pardalote <i>Pardalotus punctatus</i>	+1	P	
White-browed Scrubwren <i>Sericornis frontalis</i>	+1	P	
Yellow Thornbill <i>Acanthiza nana</i>	+1	P	
Red Wattlebird <i>Anthochaera carunculata</i>	+1	P	
Noisy Miner <i>Manorina melanocephala</i>	+1	P	
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>	+1	P	
White-naped Honeyeater <i>Melithreptus lunatus</i>	+1	P	
White-plumed Honeyeater <i>Lichenostomus penicillatus</i>	+1	P	
Eastern Yellow Robin <i>Eopsaltria australis</i>	+1	P	
Golden Whistler <i>Pachycephala pectoralis</i>	+1	P	
Magpie-lark <i>Grallina cyanoleuca</i>	+1	P	
Grey Fantail <i>Rhipidura albiscapa</i>	+1	P	
Willie Wagtail <i>Rhipidura leucophrys</i>	+1	P	
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	+1	P	
Olive-backed Oriole <i>Oriolus sagittatus</i>	+1	P	
Grey Butcherbird <i>Cracticus torquatus</i>	+1	P	
Australian Magpie <i>Gymnorhina tibicen</i>	+1	P	
Pied Currawong <i>Strepera graculina</i>	+1	P	
Australian Raven <i>Corvus coronoides</i>	+1	P	

Species	Status	Legal Status	Regional Status
Red-browed Finch <i>Neochmia temporalis</i>	+1	P	
Mistletoebird <i>Dicaeum hirundinaceum</i>	+1	P	
Welcome Swallow <i>Hirundo neoxena</i>	+1	P	
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	+1	U	
Silvereeye <i>Zosterops lateralis</i>	+1	P	
Eurasian Blackbird <i>Turdus merula</i>	+1	U	
Common Starling <i>Sturnus vulgaris</i>	+1	U	
Common Myna <i>Acridotheres tristis</i>	+1	U	
Mammals:			
Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	+1	P	
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	+1	V	
White-striped Freetail-bat <i>Tadarida australis</i>	+1	P	
Eastern Freetail-bat <i>Mormopterus</i> sp 2	+2	P	
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	+1	P	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	+1	V	
House Mouse <i>Mus musculus</i>	+1	U	
Black Rat <i>Rattus rattus</i>	+1	U	
Fox <i>Vulpes vulpes</i>	+1	U	
Dingo/Domestic Dog <i>Canis lupus</i>	+2	U	
Feral Cat <i>Felis catus</i>	+1	U	
Rabbit <i>Oryctolagus cuniculus</i>	+1	U	