



Resilient Wildlife of the Sprawling Suburbia of Southeastern Sydney

Matthew Mo and Elouise Mo

Sydney, New South Wales, Australia (matthew.sk.mo@gmail.com)

Sydney, Australia’s largest city, is situated on the eastern coast of the continent, and is recognised as one of the World Cities (Liu et al. 2016). Recently, for a period of almost two years, the more than 5 million residents were mostly confined to these 12,367 km². During 2020, SARS-CoV-2 (coronavi-

rus) reached Australia’s shores as a global pandemic developed, triggering jurisdictions to impose rules and restrictions on where people could go and at what times (Prahara et al. 2020). Similar to situations around the world, Sydney endured major periods of lockdowns across 2020 and 2021, and the overseas travel plans of many were suspended (Peters 2020). During this time, wildlife observers were forced to limit their seeking to reacquainting themselves with species assemblages close to home. For us, this was the St. George District, Sutherland Shire, and Eastern Suburbs of southeastern Sydney (Fig. 1).

Within our lifetime, we have personally witnessed astounding urban sprawl in Sydney (Rauscher and Momtaz 2017), including suburban areas being redeveloped into new central business districts, and areas that were already built-up in our earliest memories being further developed into the sky as high-rise apartments and offices (Fig. 2). Concurrently, we have spent years seeking out reptiles, amphibians and other wildlife surviving within the human-developed areas, green spaces (Fig. 3) and remnant bushland. Networks of small patches of habitat (Mo 2015 2018) and large tracts of national parks (Schulz and Magarey 2012) comprise the retained bushland of southeastern Sydney. These areas have long afforded us escapes from suburbia, and particularly so during the pandemic.

Our Own Backyard

Our journey starts during the time authorities issued stay-at-home orders, and we were subsequently limited to observ-



Fig. 1. A map of southeastern Sydney showing the locations visited in this travelogue.



Fig. 2. A view of suburban Sydney from the Hurstville central business district, showing residential unit blocks and high rise apartments and offices, as well as the Sydney central business district visible just below the horizon.



Fig. 3. A streetside urban park supporting recreational facilities and adjacent to residential homes.

ing the wildlife that visited us. Nevertheless, even from our backyard, there was a diverse range of birds to be seen (Fig. 4). Native species included the Noisy Miner (*Manorina melanocephala*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Red Wattlebird (*Anthochaera carunculata*), Australian Magpie (*Gymnorhina tibicen*), Pied Currawong (*Strepera graculina*), Grey Butcherbird (*Cracticus torquatus*), Australasian Figbird (*Sphecotheres vieilloti*), Crested Pigeon (*Ocyphaps lophotes*), Rainbow Lorikeet (*Trichoglossus moluccanus*), and Australian White Ibis (*Threskiornis molucca*). Additionally, invasive species such as the Indian Mynah (*Acridotheres tristis*), European Starling (*Sturnus vulgaris*), Red-whiskered Bulbul (*Pycnonotus jocosus*), and Spotted Turtle-dove (*Streptopelia chinensis*), among others, were observed.

Herpetofauna in our neighborhood were mainly limited to three species, which were small skinks that we then

saw throughout southeastern Sydney (Mo and Mo 2021a). The most common were the Dark-flecked Garden Sunskink (*Lampropholis delicata*) and Pale-flecked Garden Sunskink (*Lampropholis guichenoti*), which were visible on a daily basis, particularly in the vegetable patch, while the Elegant Snake-eyed Skink (*Cryptoblepharus pulcher pulcher*) was generally seen on brickwork, garage walls, and some of the trees (Fig. 5). We also used to see Eastern Blue-tongued Skinks (*Tiliqua scincoides scincoides*) in our garden as well, but this species seems to have disappeared from our neighborhood in recent years with increasing numbers of free-roaming domestic cats (Fig. 6). Our observations support scientific literature reporting high levels of predation on reptiles and other wildlife by feral and outdoor pet cats (Bamford and Calver 2012; Hall et al. 2015).

One evening, we heard a Peron's Treefrog (*Litoria peronii*) calling, but not being able to locate it, we assumed it was

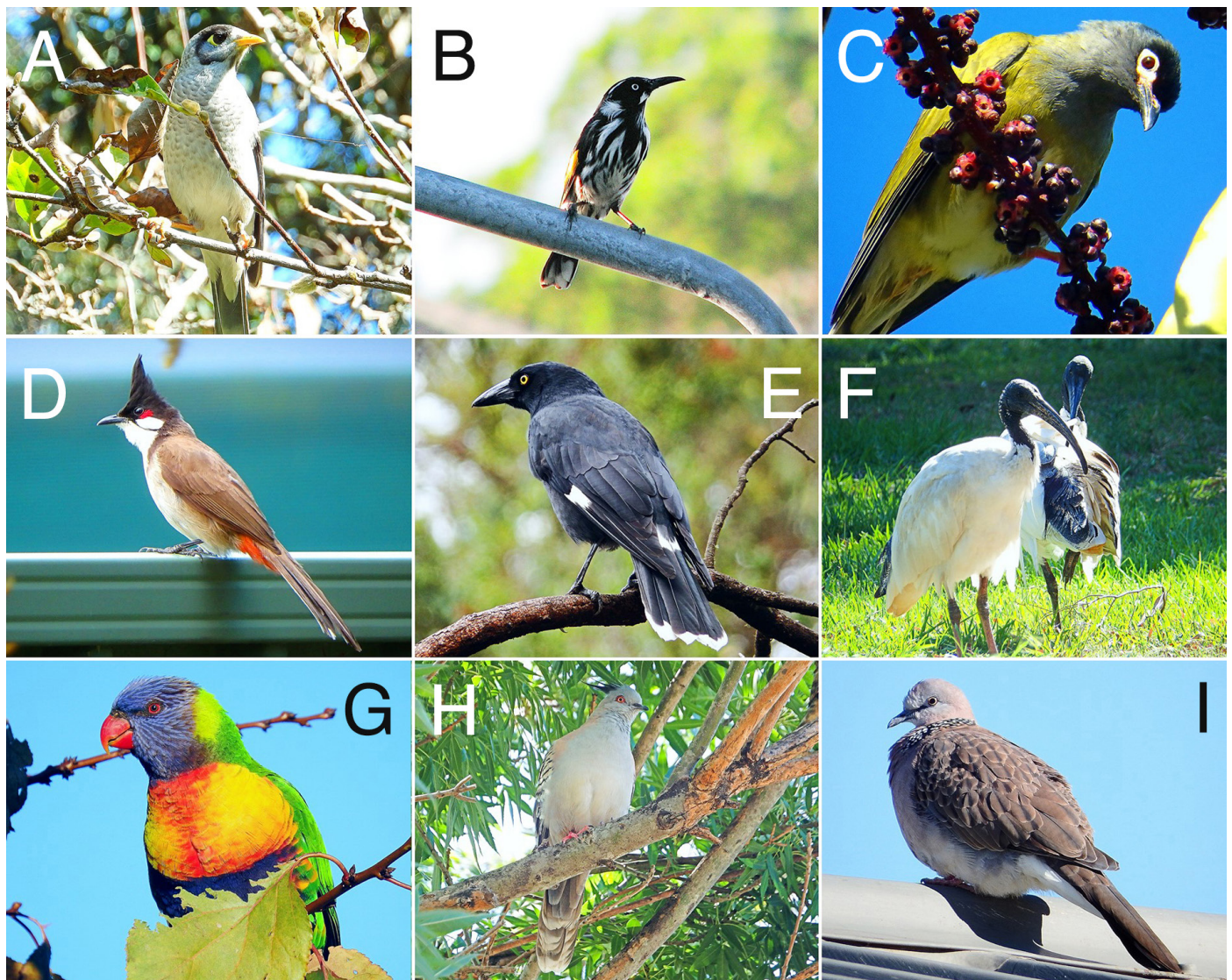


Fig. 4. Common urban birds of southeastern Sydney: Noisy Miner (*Manorina melanocephala*; A), New Holland Honeyeater (*Phylidonyris novaehollandiae*; B), Australasian Figbird (*Sphecotheres vieilloti*; C), Red-whiskered Bulbul (*Pycnonotus jocosus*; D), Pied Currawong (*Strepera graculina*; E), Australian White Ibis (*Threskiornis molucca*; F), Rainbow Lorikeet (*Trichoglossus moluccanus*; G), Crested Pigeon (*Ocyphaps lophotes*; H), and Spotted Turtle-dove (*Streptopelia chinensis*; I).



Fig. 5. The lawns, concrete crevices and brickwork of suburban areas (A), which provide an artificial habitat for reptiles such as the Dark-flecked Garden Sunskink (*Lampropholis delicata*; B), Pale-flecked Garden Sunskink (*Lampropholis guichenoti*; C), and Elegant Snake-eyed Skink (*Cryptoblepharus pulcher pulcher*; D). The Pale-flecked Garden Sunskink pictured found a basking site on a clog after one of the authors stood stationary for a long time maintaining the garden.

perhaps in garden supplies or a shipment of fresh produce, and not survived beyond the short term.

As residents were allowed outdoor exercise within a certain distance from home, we ventured into our surrounding streets, and observed populations of the Eastern Water Skink (*Eulamprus quoyii*) living entirely within suburbia (Fig. 8). Speaking with residents, some of these populations have originated from founder individuals that were captured elsewhere, deliberately released, and have subsequently reproduced. At a local nursery, we located a Common Green Treefrog (*Ranoidea caerulea*), a seemingly lone individual that has long resided at the shop’s rainwater tank (Fig. 9 left). Common Green Treefrogs appear to have declined in the St. George District (White and Burgin 2010), and despite numerous spotlighting surveys in the past 10 years, we have not found them in the bushland close to that nursery. As we left the nursery, an Australian Magpie probed the ground foraging for prey (Fig. 9 center), which, given the opportunity, would encompass lizards (Fenner et al. 2008) and frogs (Rose 1999). Down the road, there was also an immature Grey Butcherbird (Fig. 9 right), which likewise is a known predator of lizards (Rose 1999) and presumably also frogs.

perched on the roof. A few days later, we noticed the frog in one of our flowerpots (Fig. 7). We have never detected a frog in our neighborhood, and this individual was not seen or heard again, so we think this individual might have been brought into the area as a stowaway (Mo and Oliver 2021),

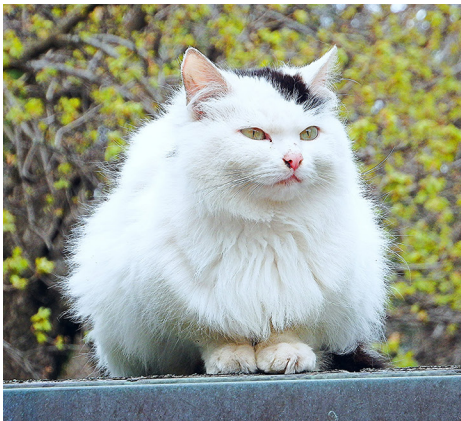


Fig. 6. One of the free-ranging cats roaming the authors’ neighborhood.



Fig. 7. A Peron’s Treefrog (*Litoria peronii*) making an appearance in a flowerpot.



Fig. 8. An Eastern Water Skink (*Eulamprus quoyii*) from a suburban population.



Fig. 9. A Common Green Treefrog (*Ranoidea caerulea*) at a local nursery store (left), an Australian Magpie (*Gymnorhina tibicen*) foraging on the lawns outside the store (center), and an immature Grey Butcherbird (*Cracticus torquatus*) also close by (right).



Fig. 10. Oatley Park (left), and two of its inhabitants, a Grey Fantail (*Rhipidura albiscapa*; upper right) and a Weasel Skink (*Saproscincus mustelinus*; lower right).



Fig. 11. Numerous Light-blue Soldier Crabs (*Mictyris longicarpus*; left), and a Silver Gull (*Larus novaehollandiae*; center) and an Australian Raven (*Corvus coronoides*; right) that were feeding on them.

Before we observed anything feed on lizards, we observed lizards themselves attacking prey. In our backyard, we watched a Dark-flecked Garden Sunskink pluck a Bark Cockroach (*Laxta granicollis*) from wood mulch and perform headshakes to dismember pieces from the live insect. Later on, we also witnessed this behavior in the Pale-flecked Garden Sunskink (Mo and Mo 2021a).

Islands of Bushland Amid the Sprawling Suburbs

As restrictions eased, we visited patches of remnant bushland in search of a broader diversity of wildlife. We have frequented these areas over the years, especially when we were following the lives of Powerful Owl (*Ninox strenua*) breeding pairs (Mo and Hayler 2015, Mo and Waterhouse 2015a; Mo et al. 2015, 2016a,b,c) and other birds (Mo et al. 2017; Mo and Waterhouse 2021).

Oatley Park is a popular 45-ha area of bushland located on a peninsula protruding into the Georges River. Walking tracks dissect dry sclerophyll forest and rocky outcrops, home of Grey Fantails (*Rhipidura albiscapa*) that sought out insects disturbed from walkers pushing aside vegetation, and Weasel Skinks (*Saproscincus mustelinus*) hiding in the cavities of

banksia trees and rock crevices (Fig. 10). Below the walking track, potential predators of lizards such as Silver Gulls (*Larus novaehollandiae*) and Australian Ravens (*Corvus coronoides*) were abundant on the sand flats; however, on this occasion, these birds were focused on picking at armies of Light-blue Soldier Crabs (*Mictyris longicarpus*) during low tide (Fig. 11).

From Oatley Park, a bicycle and maintenance road leads to mangroves that mark the start of the Lime Kiln Bay Wetlands. The slopes below this road are inhabited by a remnant population of Swamp Wallabies (*Wallabia bicolor*). The Lime Kiln Bay Wetlands are a series of constructed ponds built on a floodplain that collects water draining from the surrounding rocky outcrops and suburban streets (Bavor et al. 1995). It is also one of our study sites where 21 species of reptiles and six species of frogs have been recorded (Mo 2015, 2018), and where we once observed a White-faced Heron (*Egretta novaehollandiae*) capturing and consuming an Eastern Water Skink (Mo 2019a). On this particular visit however, we did not see any further interactions between lizards and herons, though both were present. Instead, we watched a Laughing Kookaburra (*Dacelo novaeguineae*) pounce on an Eastern Water Skink, killing it with a single blow of the bill (Fig. 12), corroborating scientific literature describing hunt-



Fig. 12. A Laughing Kookaburra (*Dacelo novaeguineae*) swallows an Eastern Water Skink (*Eulamprus quoyii*).

ing strategies of kookaburras (Blomberg and Shine 2000; see also Barker and Vestjens 1989; Rose 1997).

Other predation events we have observed in the Lime Kiln Bay Wetlands in the past include Red-bellied Blacksnakes (*Pseudechis porphyriacus*) taking frogs (Mo 2015) and freshwater eels (Mo et al. 2020a). These are the most common snakes found in these wetlands; their vivid black and red coloration form perfect camouflage in the shadows but are a striking contrast on the walking tracks and areas covered by shed Swamp Oak (*Casuarina glauca*) leaves (Fig. 13 left). They share the reedbeds with bright-colored Eastern Dwarf Treefrogs (*Litoria fallax*; Fig. 13 center) that emit a distinctive soft, sharp call, and the banks of the sediment ponds with a colony of Eastern Water Dragons (*Intellagama lesueurii lesueurii*; Fig. 13 right).

Other walkers we met were unaware of the reptiles and frogs as they admired the waterbird assemblage, which on this day comprised the Pacific Black Duck (*Anas supercili-*

osa), Chestnut Teal (*Anas castanea*), Grey Teal (*Anas gracilis*), Australian Wood Duck (*Chenonetta jubata*), White-faced Heron, Eastern Great Egret (*Ardea alba modesta*), Little Egret (*Egretta garzetta*), Dusky Moorhen (*Gallinula tenebrosa*), Purple Swampphen (*Porphyrio porphyrio*), Buff-banded Rail (*Hypotaenidia philippensis*), and Spotless Crake (*Porzana tabuensis*) (Fig. 14).

Above the wetlands, we explored the rocky outcrops, and shone torchlight into crevices as we did during a study of Broad-tailed Geckos (*Phyllurus platurus*) occurring at the site in 2010 (Mo 2014). We found several geckos including a pair in a crevice where we have previously seen up to eight individuals together (Fig. 15). They were completely still upon being discovered in the artificial light, relying on their exceptional camouflage against the rock surfaces (Doughty and Shine 1995).

Returning to the wetlands at nightfall, we observed Eastern Snake-necked Turtles (*Chelodina longicollis*) in a rocky creek that fed the ponds (Fig. 16A). Previously, we have only ever seen them at this site in the ponds during the day. The Leaf Green Treefrog (*Ranoidea phyllochroa*) was found on the banks of the creeks where the water was flowing and where juvenile Eastern Water Dragons slept in exposed positions on tree trunks less than 1 m off the ground (Fig. 16B,D). The Striped Marsh Frog (*Limnodynastes peronii*), a frog we would see or hear at virtually every wetland during our journey, was common around the ponds. One individual had a markedly different appearance from conspecifics in that its dark longitudinal bands were not unbroken across its lateral surfaces, with one band reduced to only two specks (Fig. 16C). We also saw more Peron's Treefrogs and heard the calls of the Common Eastern Froglet (*Crinia signifera*). Spotlighting at night was also a way to see the European Red Fox (*Vulpes vulpes*), a common but secretive animal in the suburbs that is also an introduced predator that has had some detrimental impacts on native reptile populations (Hu et al. 2019; Stobo-Wilson et al. 2021).

Approximately 2 km away is another constructed wetland situated within Moore Reserve. This was also one of our pre-

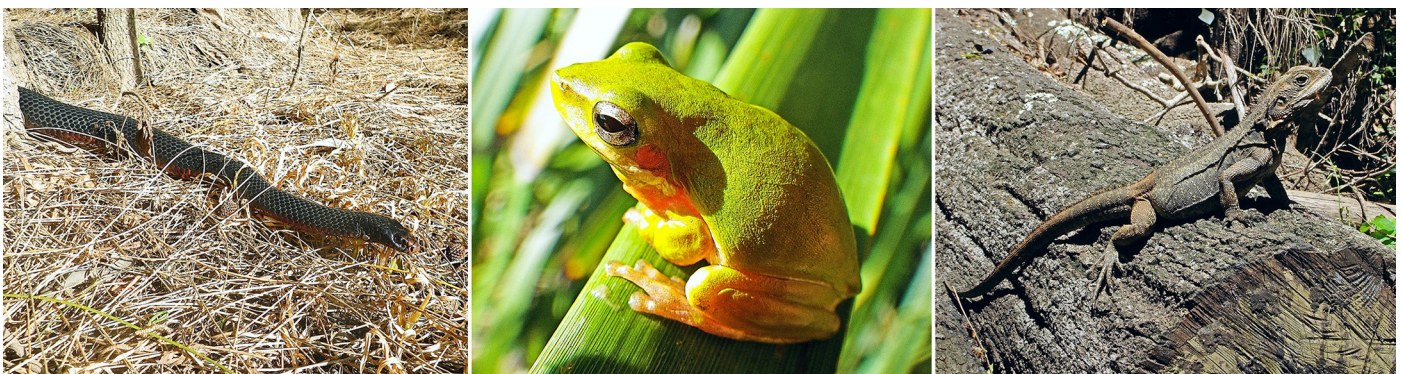


Fig. 13. Some of the inhabitants of the Lime Kiln Bay Wetlands: a Red-bellied Blacksnake (*Pseudechis porphyriacus*; left), an Eastern Dwarf Treefrog (*Litoria fallax*; center), and a female Eastern Water Dragon (*Intellagama lesueurii lesueurii*; right).

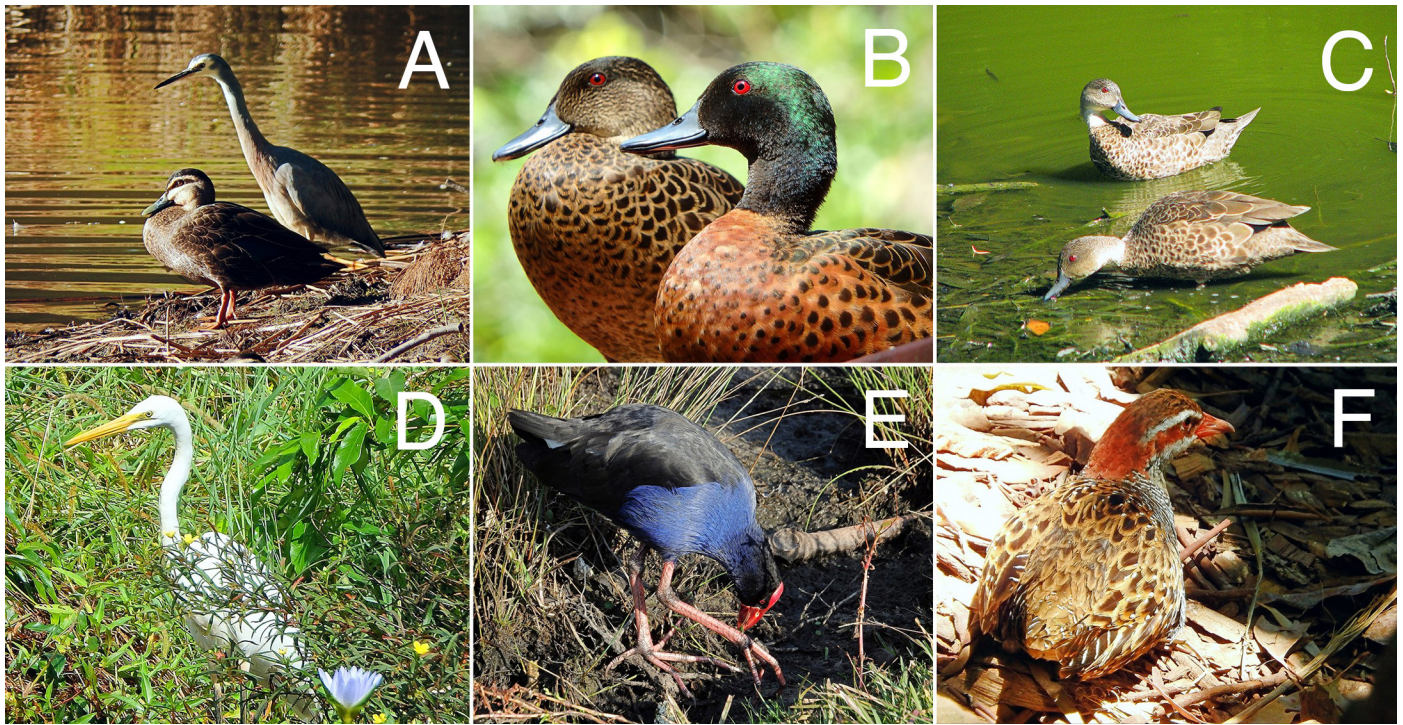


Fig. 14. Some of the birdlife of the Lime Kiln Bay Wetlands: a Pacific Black Duck (*Anas superciliosa*) with a White-faced Heron (*Egretta novaehollandiae*) (A), male Chestnut Teal (*Anas castanea*) with the greenish head and neck with a female conspecific (B), a pair of Grey Teal (*Anas gracilis*; C), an Eastern Great Egret (*Ardea alba modesta*; D), a Purple Swamphen (*Porphyrio porphyrio*; E), and a Buff-banded Rail (*Hypotaenidia philippensis*; F).



Fig. 15. A rocky outcrop overlooking dry sclerophyll forest and the Lime Kiln Bay Wetlands (left), and a pair of Broad-tailed Geckos (*Phyllurus platurus*) revealed by torchlight in one of the rock crevices (right). Note, the mites on the gecko in the foreground.

vious study sites where we observed aspects of breeding biology in the Australasian Grebe (*Tachybaptus novaehollandiae*; Mo and Waterhouse 2015b,c) and Australian Eurasian Coot (*Fulica atra australis*; Mo and Waterhouse 2020). On this visit, both species were present, as well as some of the waterfowl species we saw at the Lime Kiln Bay Wetlands, Hardheads (*Aythya australis*), Australian White Ibis, the

Hoary-headed Grebe (*Poliocephalus poliocephalus*), Great Cormorant (*Phalacrocorax carbo*), and some Royal Spoonbills (*Platalea regia*) standing in the mud (Fig. 17). Around them, Eastern Water Skinks were basking on rocks and on the bank. Despite the park being busy with recreationalists, an Eastern Blue-tongued Skink showed itself on the side of the walking track adjacent to the wetland, while a Three-toed Skink

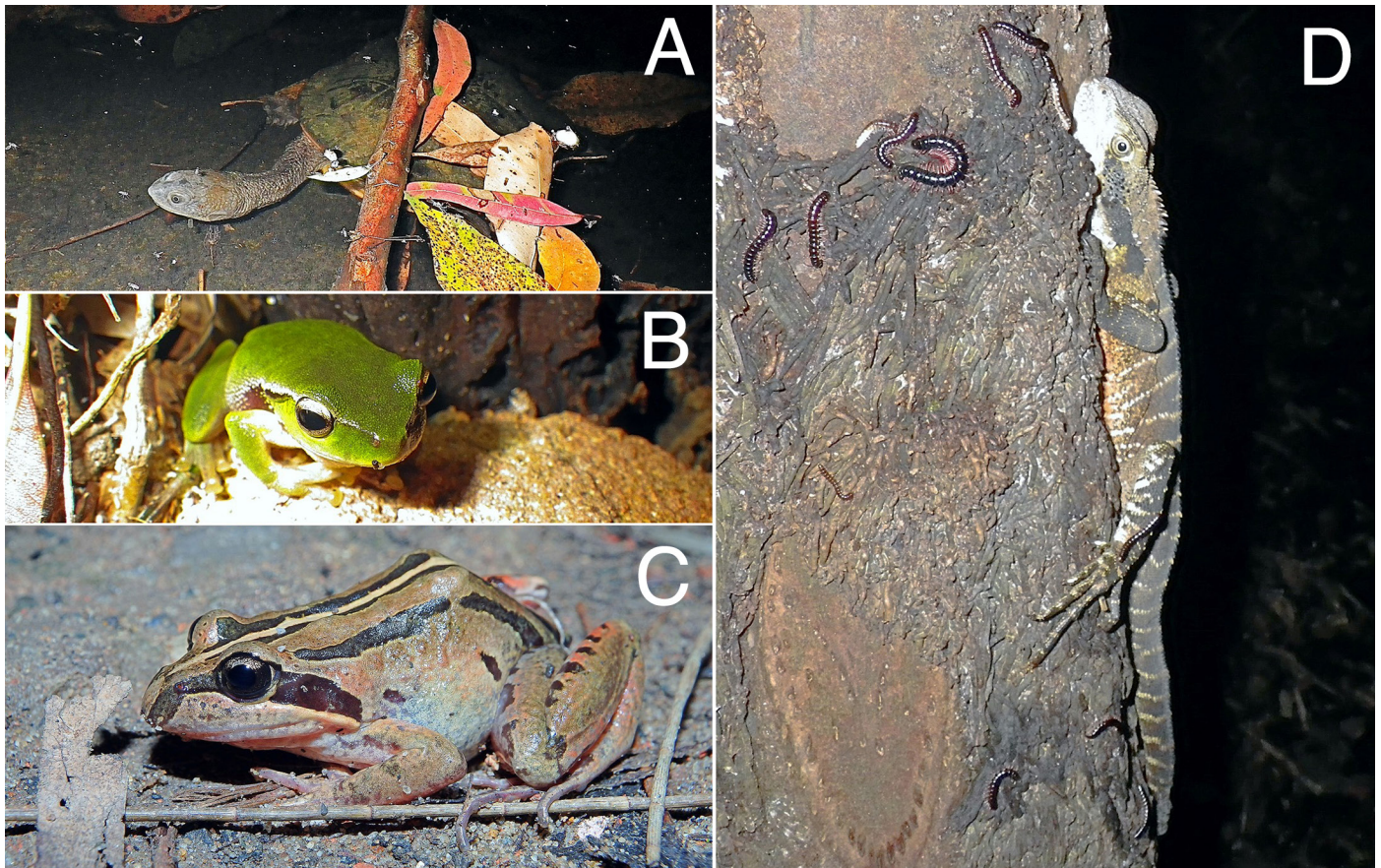


Fig. 16. Animals found by spotlighting in the Lime Kiln Bay Wetlands: an Eastern Snake-necked Turtle (*Chelodina longicollis*; A), a Leaf Green Treefrog (*Ranoidea phyllochroa*; B), one of the many Striped Marsh Frogs (*Limnodynastes peronii*; C), and an Eastern Water Dragon (*Intellagama lesueurii lesueurii*) momentarily woken from sleep (D).



Fig. 17. Some of the waterbirds using the Moore Reserve constructed wetland: a female Hardhead (*Aythya australis*; A), two Australasian Grebes (*Tachybaptus novaehollandiae*; B), a Hoary-headed Grebe (*Poliiocephalus poliiocephalus*; C), preening Australian Eurasian Coots (*Fulica atra australis*; D), a Great Cormorant (*Phalacrocorax carbo*) gliding across the water surface (E), and a trio of Royal Spoonbills (*Platalea regia*; F).

(*Saiphos equalis*) that had no interest in showing itself was revealed beneath a rotting log (Fig. 18). Flying above them were Galahs (*Eolophus roseicapilla*), Australian King-parrots (*Alisterus scapularis*), Crimson Rosellas (*Platycercus elegans*), Musk Lorikeets (*Glossopsitta concinna*), Eastern Spinebills (*Acanthorhynchus tenuirostris*), and Magpie Larks (*Grallina cyanoleuca*).

A National Park in the Suburbs

Georges River National Park is a 514-ha protected area mostly bordered by suburbia. A major feature is Yeramba Lagoon, the location of the first established population of invasive Red-eared Sliders (*Trachemys scripta elegans*) in New South Wales (Burgin 2006; Robey et al. 2011). This is also where we once observed a Greater Bar-sided Skink (*Concinnia tenuis*) retreating and becoming stuck in a narrow crevice

opening in the rocky outcrops overlooking the Georges River (Mo 2012). On this visit, this species was numerous, and one individual fled, potentially due to the presence of a Brown Goshawk (*Falco cenchroides*) perched in a tree close to the park boundary (Fig. 19). Broad-tailed Geckos were also numerous in the rock crevices. As we walked around the lagoon, there was a diversity of birds, including the Yellow-tailed Black Cockatoo (*Zanda funerea*), Silvereye (*Zosterops lateralis*), Black-faced Cuckoo-shrike (*Coracina novaehollandiae*), Lewin's Honeyeater (*Meliphaga lewinii*), Golden Whistler (*Pachycephala pectoralis*), Spotted Pardalote (*Pardalotus punctatus*), and Eastern Whipbird (*Psophodes olivaceus*).

Walking along the Georges River (Fig. 20 left), there was an equal diversity of birds, including the Intermediate Egret (*Ardea intermedia*), Sulphur-crested Cockatoo (*Cacatua galerita*), Little Corella (*Cacatua sanguinea*), Eastern Rosella



Fig. 18. An Eastern Blue-tongued Skink (*Tiliqua scincoides scincoides*; left), and a Three-toed Skink (*Saiphos equalis*; right).



Fig. 19. Rocky outcrops of the Georges River National Park (left), which are home to the Brown Goshawk (*Falco cenchroides*; upper right) and Greater Bar-sided Skink (*Concinnia tenuis*; lower right).



Fig. 20. One of the remaining natural sections of the Georges River (left), and a male Eastern Water Dragon (*Intellagama lesueurii lesueurii*; right).

(*Platycercus eximius*), Red-browed Firetail Finch (*Neochmia temporalis*), Superb Fairy-wren (*Malurus cyaneus*), Willie Wagtail (*Rhipidura leucophrys*), Eastern Yellow Robin (*Eopsaltria australis*), and Brown Thornbill (*Acanthiza pusilla*). A large male Eastern Water Dragon basking on a rock was unbothered by the birds, picnickers and fishermen (Fig. 20 right).

While we were in the area, we visited the Sylvan Grove Native Garden in Picnic Point, which adjoins the Georges River National Park. This is one of our favorite locations for seeing Satin Bowerbirds (*Ptilonorhynchus violaceus*) close to home (Fig. 21). The garden boasts over 1,500 species of flora. There were warning signs for snakes because Red-bellied Blacksnakes occasionally wander up from Yeramba Lagoon. The main wildlife we saw, besides the bowerbirds, were Eastern Water Skinks and Weasel Skinks running between patches of sun and shade.

The Rockdale Wetlands Corridor

In the eastern part of the St. George district is a series of 12 discrete areas of remnant bushland known as the Rockdale Wetlands Corridor, which are documented thoroughly by renowned local ecologist Dr. Arthur White (White and Burgin 2004; White 2010). As we looked for somewhere to park the car, the first animals could be seen, Welcome Swallows (*Hirundo neoxena*) flying swiftly over the sports fields, and introduced Rock Doves (*Columba livia*) being opportunistic over human food. At the Rockdale Bicentennial Park, the most eye-catching sights when we approached the water were the banks of Australian White Ibis nests in the trees and family groups of Australian Wood Ducks (Fig. 22 upper left and upper right). Other waterfowl, rails, Royal Spoonbills, and Little Pied Cormorants (*Microcarbo melanoleucos*) also inhabited the wetland.



Fig. 21. A male Satin Bowerbird (*Ptilonorhynchus violaceus*).

While we watched a pair of Dusky Moorhens busily preparing their nest, a Macquarie Turtle (*Emydura macquarii*) climbed upon the developing structure (Fig. 22 bottom). During this pause in our walk, introduced Brown Rats (*Rattus norvegicus*) scampered past and crossed the waterway. Back on our feet, we were surrounded by the vocalizations of Red-whiskered Bulbuls (*Pycnonotus jocosus*) and Red-rumped Parrots (*Psephotus haematonotus*), and the sounds of Eastern Water Skinks scuttling away when we wandered close. Away from other birdlife, we spotted an elusive Nankeen Night-heron (*Nycticorax caledonicus*) staying completely motionless.

The Rockdale Wetlands Corridor is another site where Red-eared Sliders have been recorded and captured (Mo 2019b), but we did not see any on this visit. Being in a documented site of this invasive turtle brought about some reflection of how, despite exotic herpetofauna being strictly pro-



Fig. 22. Inhabitants of the Rockdale Wetlands Corridor include a rookery of Australian White Ibis (*Threskiornis molucca*; upper left), a family of Australian Wood Ducks (*Chenonetta jubata*; upper right), and a Macquarie Turtle (*Emydura macquarii*) basking on a Dusky Moorhen (*Gallinula tenebrosa*) nest (bottom).

hibited as pets in Australia, records of free-living non-native species have shown that private keeping of exotic reptiles and amphibians still occurs prolifically (McFadden et al. 2017). We ourselves have in the past unexpectedly encountered a dead Red Cornsnake (*Pantherophis guttatus*) on a suburban road not far from the Rockdale Wetlands Corridor (Mo and Mo 2021b), and have had conversations with people who spoke of Boa Constrictors (*Boa constrictor*) from Central and South America found in the local national parks.

The Wollie Valley

Another of our favorite oases in the St. George District is the Wollie Valley, which has been well documented by the Wollie Creek Preservation Society (Madden and Muir 1996; Wollie Creek Preservation Society 2006; Little et al. 2010). A particularly inspiring place is Nanny Goat Hill, which is not far from adjacent homes, but feels like a hidden rocky outcrop rising out of remnant woodland, giving another view of the dense suburbia encasing this pocket of bushland. This natural area, however limited in expanse, provides suitable habitat for Copper-tailed Skinks (*Ctenotus taeniolatus*), mostly hidden below slabs of rock but sometimes observed basking (Fig. 23 left), as well as Greater Bar-sided Skinks and Broad-

tailed Geckos. There is also a population of Jacky Dragons (*Amphibolurus muricatus*; Fig. 23 right), which is locally significant as this species has disappeared from most of the bushland remnants in southeastern Sydney outside of the national parks and golf courses (Shea 2010). On a tributary of Wollie Creek, we observed Eastern Water Dragons and Eastern Water Skinks sharing basking sites on slabs of remnant sandstone. The Eastern Blue-tongued Skink is also a regularly seen species here, sometimes heard moving through leaf litter. A memorable occasion involving this species in the Wollie Valley was a day we encountered an Eastern Blue-tongued Skink with an amputated tail that had started to regenerate (Mo 2020a).

The Wollie Valley is also one of the growing number of locations where flying fox roosts have formed in the Sydney region (Fig. 24). The flying fox roost in Turrella Reserve has two species, the Grey-headed Flying Fox (*Pteropus poliocephalus*) and the Black Flying Fox (*Pteropus alecto*), which are both sometimes referred to as fruit bats. A few months before our visit, the eastern seaboard experienced high daytime temperatures, which resulted in some 72,000 flying fox mortalities, including a small number in the Wollie Valley (Mo et al. 2022). As we walked around the site with our eyes focused



Fig. 23. One of Nanny Goat Hill's Copper-tailed Skinks (*Ctenotus taeniolatus*; left), and a Jacky Dragon basking on a fallen log at the base of the rocky outcrop (right).



Fig. 24. The flying fox roost in the Wolli Valley provides a daytime gathering site for the Grey-headed Flying Fox (*Pteropus poliocephalus*; left) and Black Flying Fox (*Pteropus alecto*; right).

on the bats, we noticed the distinctive shimmer of jet-black scales, giving away a Red-bellied Blacksnake moving quickly away.

The Eastern Suburbs

The Eastern Suburbs lie east and southeast of the city of Sydney. At the southern end is La Perouse, which is situated on a peninsula that juts out into Botany Bay. Anglers frequent the rock ledges and we once saw an angler reel in a sea snake from the bay. On this visit, an Australasian Pipit (*Anthus novaeseelandiae*) fluttered about the lawn areas above the rock ledges.

A large part of La Perouse is the northern section of Kamay Botany Bay National Park. As we ventured in, we startled a flock of Mainland Brown Quail (*Synoicus ypsilophorus australis*) that took flight and disappeared quickly from view. Copper-tailed Skinks darted off the walking track as

we approached them. For such a vivid black and white lizard, they were well-camouflaged amongst the leaf litter and beneath shrubs. This offers defense against some of the aerial predators that we spotted, including Laughing Kookaburras and Black-shouldered Kites (*Elanus axillaris*). Stepping out onto a golf course, we saw a Black-shouldered Kite nesting in a tree (Fig. 25 left). As we watched, its mate brought a lizard back to the nest. Another reptile and frog predator, a Cattle Egret (*Bubulcus ibis*) prowled along a section of grass that was less frequently mowed (Fig. 25 center). We waited to see if it would be successful in capturing a lizard or frog, but its prey on this day were invertebrates. Below some discarded sheets of plastic, we found an Eastern Striped Skink (*Ctenotus robustus*; Fig. 25 right) nestled into an accumulation of leaves, staying well out of predators' reach.

As night approached, a Golden-headed Cisticola (*Cisticola exilis*) perched quietly on a shrub. Walking some of



Fig. 25. A golf course provided home for a Black-shouldered Kite (*Elanus axillaris*) on a nest (left), a Cattle Egret (*Bubulcus ibis*; center), and an Eastern Striped Skink (*Ctenotus robustus*) that we were able to examine closely (right).



Fig. 26. Amphibians observed in the La Perouse section of Kamay Botany Bay National Park: an Eastern Banjo Frog (*Limnodynastes dumerilii*; left), a Screaming Treefrog (*Litoria quiritatus*; center), and a Common Eastern Froglet (*Crinia signifera*; right).



Fig. 27. Off the coast of Sydney, a pair of Black-browed Albatrosses (*Thalassarche melanophris*) scavenge on a carcass (left) near a Humpback Whale (*Megaptera novaeangliae*) providing a momentary glimpse of its dorsal surface (right).

the same tracks as during the day, our headtorches revealed an Eastern Banjo Frog (*Limnodynastes dumerilii*) on the forest floor, numbers of Screaming Treefrogs (*Litoria quiritatus*) in trees and puddles, and Common Eastern Froglets in roadside ditches (Fig. 26).

On another day, we did the famous Bondi to Coogee walk, which stretches 6 km along the coastal headland cliffs and beachfronts between the two iconic locations. Above us, an Osprey (*Pandion haliaetus*) flew over, and on the water, two Black-browed Albatrosses (*Thalassarche melanophris*) fed on a floating carcass, and a Humpback Whale (*Megaptera novaeangliae*) swam past (Fig. 27). The sea cliffs are also an area for the Peregrine Falcon (*Falco peregrinus*). We shone torches into

some of the rock crevices, which revealed Broad-tailed Geckos and Lesueur's Velvet Geckos (*Amalosia lesueurii*; Fig. 28). On previous visits at night, we have found the latter easy to find, and unfortunately, we have over the years heard stories of some hobby snake owners collecting them illegally to feed their pets. As we approached the end of the walk, an Eastern Water Skink basked on a wooden walkway unbothered by passers-by. Below the lizard were two of our favorite snorkelling spots in Sydney, Clovelly Bay and Gordons Bay where swimmers can easily spot marine life such as Eastern Blue Groper (*Achoerodus viridis*), Spotted Sea Hare (*Aplysia dactylomela*), Stripey (*Microcanthus strigatus*), Yellowfin Bream (*Acanthopagrus australis*), and flat-head (*Platycephalus* spp.) (Fig. 29).



Fig. 28. A Lesueur's Velvet Gecko (*Amalosia lesueurii*) with the vast Pacific Ocean in the background.

Centennial Park

A popular wildlife-spotting site in the inner part of Sydney is Centennial Park, a green space spread over 189 ha less than

5 km from the Sydney central business district. We explored the park's remnant wetlands and constructed ponds that were flanked by expanses of lawn areas, sporting fields, formal gardens, and heritage buildings (Hamilton and Penny 2015). Like the more than 30 million people that visit Centennial Park per annum, we have enjoyed visiting this location over the years, and have published some of our wildlife observations in peer-reviewed journals (Mo 2019c, 2020b,c). Each waterbody in Centennial Park is named, and the Duck Pond is a particularly popular site where crowds gather to observe the diverse birdlife, including the Black Swan (*Cygnus atratus*), Australian Wood Duck, Pacific Black Duck, Chestnut and Grey Teal, Hardhead, Australasian Shoveler (*Spatula rhynchotis*), Australian Pelican (*Pelecanus conspicillatus*), Little Pied Cormorant, Purple Swamphen, Dusky Moorhen, and Australian Eurasian Coot (Fig. 30). The Duck Ponds have islands that offer waterbirds a refuge from people, upon which the nests of Pied Cormorants (*Phalacrocorax varius*) and Australian White Ibis were present in some of the trees, though they were not being used on this visit.

There were also non-native waterfowl residing in Centennial Park such as large flocks of domesticated Greylag Geese (*Anser anser domesticus*; Fig. 30) that we saw wander-

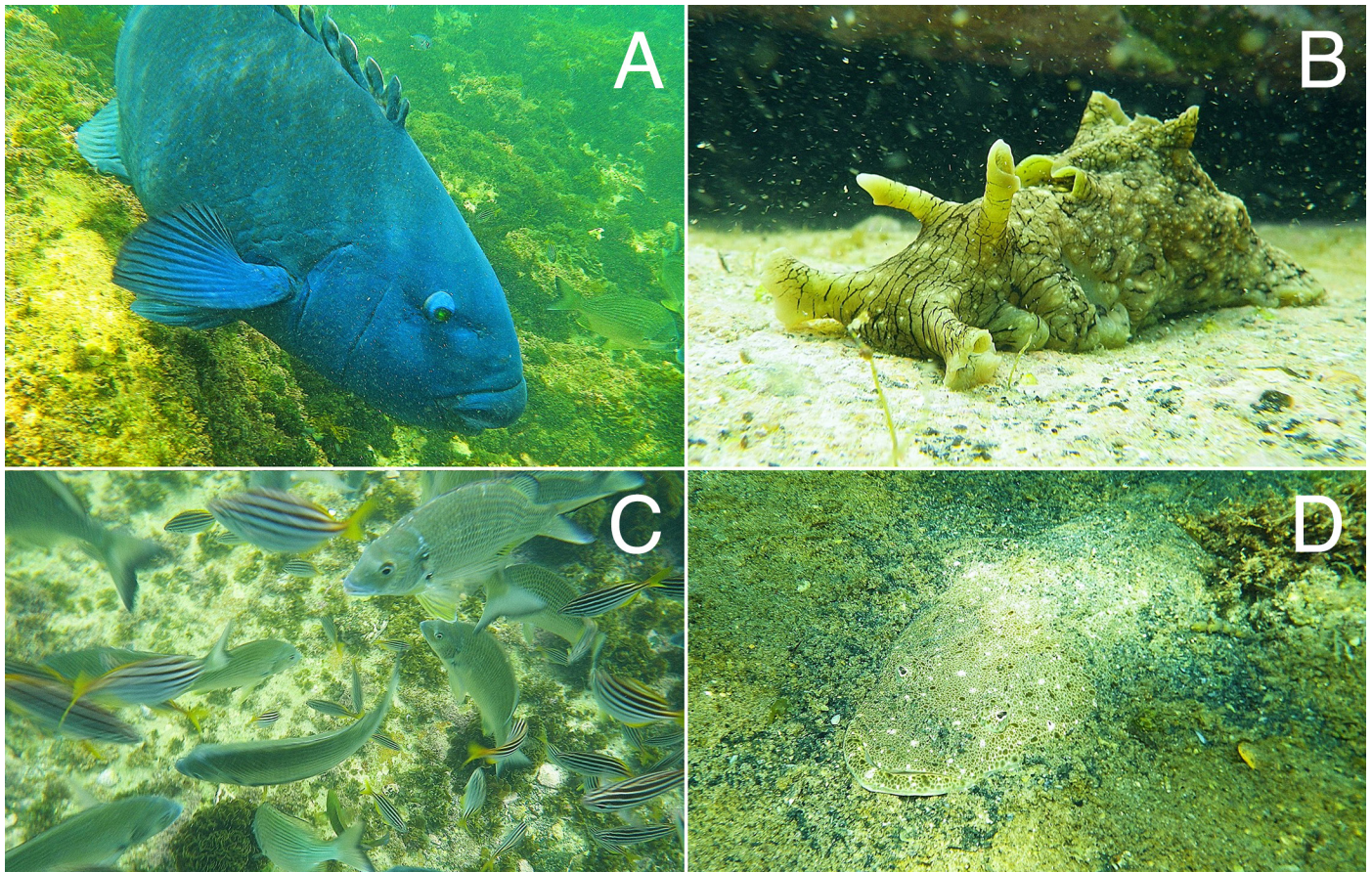


Fig. 29. Marine life of Clovelly Bay and Gordons Bay include an adult male Eastern Blue Groper (*Achoerodus viridis*; A), a Spotted Sea Hare (*Aplysia dactylomela*; B), Stripey (*Microcanthus strigatus*) and Yellowfin Bream (*Acanthopagrus australis*) in a mixed-species school (C), and a flathead (*Platycephalus* spp.) partially buried in sand (D).



Fig. 30. The Duck Pond in Centennial Park is a popular bird-watching location (top). Amongst the birdlife, a domesticated Greylag Goose (*Anser anser domesticus*) with adult Black Swans (*Cygnus atratus*) and an Australian Pelican (*Pelecanus conspicillatus*) (lower left), and a mixed flock of juvenile Black Swans, Hardheads (*Aythya australis*) and Australian Eurasian Coots (*Fulica atra australis*) (lower right).



Fig. 31. Invasive Red-eared Sliders (*Trachemys scripta elegans*) basking alongside an Australasian Darter (*Anhinga novaehollandiae*) (left), Macquarie Turtles (*Emydura macquarii*) and an Eastern Snake-necked Turtle (*Chelodina longicollis*) (right).

ing the grounds. They made their presence known with their honking vocalizations, and on numerous occasions, we were photographing another animal and became alerted to Greylag Geese approaching us from behind by their noises. Among our favorite non-native animals to look out for at Centennial Park is a pair of two different species of waterfowl, a Muscovy

Duck (*Cairina moschata*) and a domesticated Mallard (*Anas platyrhynchos*), which have been seen together for several years (Mo 2020c), including on this visit.

Next to the Duck Pond is a wetland forest dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*) known as Lachlan Swamp, which provides a glimpse into what the area

looked like prior to European settlement. From far off, we could hear the vocalizations of hundreds of Grey-headed and Black Flying Foxes. More subtle were the calls of Common Eastern Froglets and Striped Marsh Frogs as we walked along the boardwalks dissecting the wetland forest. Eastern Water Skinks scuttled away as we approached while an Eastern Blue-tongued Skink relied on a lack of movement to unsuccessfully evade our attention.

Between the ponds, pairs of Masked Lapwings (*Vanellus miles*) patrolled the lawn sections. Rows of Canary Island Date Palms (*Phoenix canariensis*) first planted in 1908 provide habitat for local fauna, including Rainbow Lorikeets, Eastern Barn Owls (*Tyto alba delicatula*; Mo 2019c), and Elegant Snake-eyed Skinks. The owl was well hidden in the dark shadows of the palm fronds, but on previous visits, we found them in more sunlit perches.

Some of the ponds had lower water levels, leading to the formation of mudflats, attracting rare visitors like the Black-fronted Dotterel (*Euseyornis melanops*). On previous visits, we have also observed a Red-kneed Dotterel (*Erythrogonys cinctus*) and Pink-eared Ducks (*Malacorhynchus membranaceus*), which are species generally more associated with inland regions.

One of the larger ponds, Busbys Pond, named after one of the park's important staff members from the 1800's, was the venue for a family's outdoor party. The children were feeding bread to the ducks, Black Swans, Silver Gulls and Rock Doves, which progressively developed into a frenzy. Several Australian Long-finned Eels (*Anguilla reinhardtii*) and European Carp (*Cyprinus carpio*) snapped up bread pieces between the birds. Interestingly, some Macquarie Turtles also joined the feeding but stayed in the water.

Centennial Park is also one of the locations in Sydney where the Red-eared Slider has established a population (Mo 2019b). On the distant side of Busbys Pond, we observed the first Red-eared Slider of the day on a floating log within inches of an Australasian Darter (*Anhinga novaehollandiae*) drying its wings, followed by a second slider basking on another log with a pair of Macquarie Turtles and an Eastern Snake-necked Turtle (Fig. 31).

As the sun set, we watched another crowd of people feeding birds, this time a large aggregation of Sulphur-crested Cockatoos, Long-billed Corellas (*Cacatua tenuirostris*), and the ever-present Rock Doves (Fig. 32). The cockatoos were bold, landing on people's arms, shoulders, and heads. As this played out, the sky above hosted an amazing evening fly-out of Grey-headed and Black Flying foxes from the roost in Lachlan Swamp.

Botanic Gardens of the Sutherland Shire

The Sutherland Shire covers an area of 370 km², forming the southern boundary of the Sydney metropolitan area. Our



Fig. 32. A flurry of Sulphur-crested Cockatoos (*Cacatua galerita*), Long-billed Corellas (*Cacatua tenuirostris*) and Rock Doves (*Columba livia*) receiving food from Centennial Park visitors.

first location in the shire was the Joseph Banks Native Plants Reserve, a botanic garden situated in the suburb of Kareela. A particularly interesting feature was an Aboriginal food and medicinal plant-themed section, which was frequented by Weasel Skinks and Pale-flecked Garden Sunskinks. In the trees above, Grey Butcherbirds and Laughing Kookaburras watched the lizards intently. From the garden 200 m away we could hear Grey-headed Flying Foxes, which have roosted in Kareela since 2008 (Mo et al. 2020b). Venturing into the roost, we observed an Eastern Water Dragon inhabiting the ephemeral creek that runs through the site.

Travelling further south, we visited the E.G. Waterhouse National Camellia Gardens in Caringbah South, shortly after its 50th anniversary since first opening on 18 July 1970. The gardens also have a roost of Grey-headed Flying Foxes, which were first recorded at the site in July 2016 (Mo et al. 2020b). Below them, the ponds were a hive of flocks of Australian Wood Ducks, Pacific Black Ducks, Chestnut Teal, Hardheads, domesticated Mallards, Purple Swamphen, Dusky Moorhen, Australian Eurasian Coots, and Australian White Ibis. Eastern Water Skinks were common at the ponds and on all the brick walking paths. One Eastern Blue-tongued Skink was also on a path and scuttled away on our approach. Where the ponds were adjacent to lawn sections, a population of Eastern Water Dragons thrived, basking in the open areas and using the water as their refuge from predators. As we watched and walked around them, when we came too close to their nests, Noisy Miners swooped us, as they have done on previous visits (Mo 2019d).

Outside the E.G. Waterhouse National Camellia Gardens is a bushland remnant along the Hacking River. Here, we observed a Lace Monitor (*Varanus varius*) in a tree

(Fig. 33), being watched intently and warily by a Sacred Kingfisher (*Todiramphus sanctus*) nearby. We had previously heard reports of Lace Monitors occurring at this site, and sometimes wandering through the gardens.



Fig. 33. An adult Lace Monitor (*Varanus varius*) lying motionless in a tree.

The Historic Kurnell Peninsula and Cronulla’s Iconic Beachfront

The Kurnell Peninsula, located across Botany Bay from La Perouse, has a significant place in Australian history. It was here on 29 April 1770 that Captain James Cook landed and made first contact with the Gweagal people, the indigenous people of the area (Benson and Eldershaw 2007). As we arrived at the Kurnell section of Kamay Botany Bay National Park, a pair of Masked Lapwings watched us from an open lawn. Eastern Water Skinks watched people as they wandered down the beach, and Greater Bar-sided Skinks scaled the walls



Fig. 34. A juvenile Pacific Gull (*Larus pacificus*) scavenging a washed-up carcass (left) close to the monument commemorating Captain James Cook’s 1770 landing in Kurnell (right).

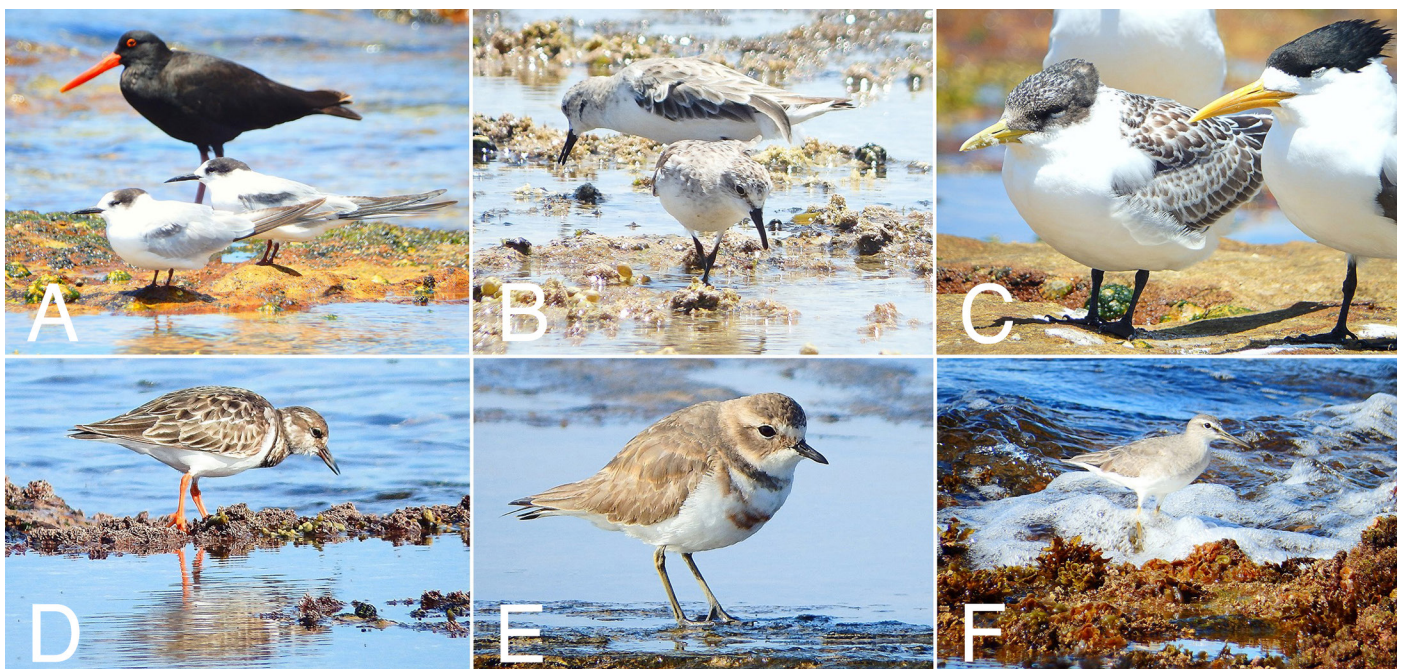


Fig. 35. Some of the shorebirds roosting and foraging at the Boat Harbour Aquatic Reserve: a pair of Common Terns (*Sterna hirundo*) in front of a Sooty Oystercatcher (*Haematopus fuliginosus*) (A), a pair of Red-necked Stints (*Calidris ruficollis*; B), a juvenile and adult Greater Crested Tern (*Thalasseus bergii*; C), a Ruddy Turnstone (*Arenaria interpres*) patrolling the edge of the rock platform (D), a Double-banded Plover (*Charadrius bicinctus*; E), and a Grey-tailed Tattler (*Tringa brevipes*) in the waves (F).



Fig. 36. Three species of cormorants: from left to right, the Pied Cormorant (*Phalacrocorax varius*), Little Pied Cormorant (*Microcarbo melanoleucos*), and Little Black Cormorant (*Phalacrocorax sulcirostris*).

of the visitor center. On the beach, a pair of juvenile Pacific Gulls (*Larus pacificus*) scavenged meat from a carcass that had washed up close to the monument that commemorates the place of Cook's landing (Fig. 34). Since European settlement, the site has been used for a range of different purposes including farming, grazing, and public recreation, which has resulted in the loss of much of the natural vegetation communities to various non-indigenous plantings.

While we were on the Kurnell Peninsula, we made a visit to the Boat Harbour Aquatic Reserve to indulge in shorebird spotting. A White-bellied Sea-eagle (*Haliaeetus leucogaster*) soared overhead, and Common Stingarees (*Trygonoptera testacea*) inhabited the shallow waters of the beach leading to the aquatic reserve. A range of birds were seen on the rock platforms, including both species of oystercatchers found in Australia, the Sooty Oystercatcher (*Haematopus fuliginosus*) and Australian Pied Oystercatcher (*Haematopus longirostris*), the Pacific Golden Plover (*Pluvialis fulva*), Double-banded Plover (*Charadrius bicinctus*), Ruddy Turnstone (*Arenaria*

interpres), Red Knot (*Calidris canutus*), Red-necked Stint (*Calidris ruficollis*), Grey-tailed Tattler (*Tringa brevipes*), Greater Crested Tern (*Thalasseus bergii*), Caspian Tern (*Hydroprogne caspia*), Common Tern (*Sterna hirundo*), Silver Gull, and Kelp Gull (*Larus dominicanus*) (Fig. 35). On the beach, seen from afar, was a Eurasian Curlew (*Numenius arquata*), which was very sensitive to the presence of people. We were also fortunate to capture a photograph showing three species of cormorants, the Pied Cormorant, Little Black Cormorant (*Phalacrocorax sulcirostris*), and Little Pied Cormorant (Fig. 36).

In another part of the Kurnell Peninsula, there is a great expanse of rolling sand dunes that has been featured in films and used by high-profile athletes and recreationists for fitness training. Now formally known as the Cronulla Sand Dune and Wanda Beach Coastal Landscape, the site was listed on the New South Wales State Heritage Register on 26 September 2003. The first time we visited this location many years ago, we heard rustling in some shrubs, out of which



Fig. 37. An artificial lake in the Cronulla Sand Dune and Wanda Beach Coastal Landscape (left), and a Common Ringtail Possum (*Pseudocheirus peregrinus*) on a barbed-wire fence (right).

two adult Red-bellied Blacksnakes briefly emerged, engaged in combat, before disappearing again beneath the vegetation. On another previous visit, we observed an Eastern Blue-tongued Skink exhibiting tail bifurcation, which was reported in a scientific note (Mo 2020a).

A history of sand mining in the Cronulla Sand Dune and Wanda Beach Coastal Landscape (Doody 2013) has left behind pits in the sand dunes that have filled with water to create artificial lakes (Fig. 37 left). These waterbodies have since been exploited by frogs and waterbirds (Payne 2014; Mo and Waterhouse 2016). We became aware that this site supports Jervis Bay Treefrogs (*Litoria jervisiensis*) a few years earlier from a scientific paper published in *Australian Zoologist* (Payne 2014). Unfortunately, on this visit, heavy rainfall had caused water levels to rise, inundating the previously shallow areas into which in the past we had been able to wade and find the frogs. We did, however, observe the common Striped Marsh Frogs and Peron's Treefrogs, and hear Common Eastern Froglets calling. On our way back to the car, we saw a Common Ringtail Possum (*Pseudocheirus peregrinus*) walking along the top of a barbed-wire fence (Fig. 37 left).

Driving home that night, we encountered the other of Sydney's common possums, the Common Brushtail Possum (*Trichosurus vulpecula*) crossing a busy road and scampering up a street tree (Fig. 38 left). These possums are one of the mammals that thrive in Australia's urban areas, roosting in artificial structures and sustaining populations in suburbs completely devoid of bushland remnants (Eymann et al. 2006). This has subsequently led to pest control companies incorporating a possum removal component into their business models (Matthews et al. 2004). The next morning, we noticed another creature of the night, a Tawny Frogmouth (*Podargus strigoides*) roosting in a street tree near our house (Fig. 38 right). This bird was exhibiting its species' characteristic camouflage (Körtner and Geiser 1999).

On another day, we joined the masses of recreationalists and walked along the Cronulla Esplanade Walk, which is a paved coastal walk that links the iconic beaches and rocky headlands. With houses and unit blocks lining the Esplanade, Dark-flecked Garden Sunsninks and Elegant Snake-eyed Skinks were in their element. We once again observed a White-faced Heron hunting in short vegetation, which



Fig. 38. Two of Sydney's common nocturnal wildlife: a Common Brushtail Possum (*Trichosurus vulpecula*) in the fork of a tree (left), and a Tawny Frogmouth (*Podargus strigoides*) roosting during the day (right).



Fig. 39. A Common Eastern Froglet (*Crinia signifera*) living in one of the water-filled groves on a rock platform along the busy Cronulla Esplanade Walk.



Fig. 40. A Pacific Golden Plover (*Pluvialis fulva*) on the left and a Red Knot (*Calidris canutus*) on the right.

reminded us of a previous visit when we saw one preying upon a sunskink (Mo 2019a). Amphibians were also represented on the Esplanade by Common Eastern Froglets and their tadpoles that dwelt in groves in the natural sandstone where rainwater, and presumably some seawater, had accumulated (Fig. 39).

Eastern Water Skinks were spotted on some parts of the Esplanade, as were predators such as the Nankeen Kestrel (*Falco cenchroides*). In these urban areas, we would expect lizards to form a substantial proportion of the kestrels' diet (Mo 2019e).

The shorebird assemblage on the rock platforms along the Esplanade were less diverse than the Boat Harbour Aquatic Reserve. This area was generally limited to shorebird species that are less sensitive to high rates of human foot traffic. Sooty Oystercatchers, Silver Gulls, Greater Crested Terns, and Caspian Terns were the most common shorebirds, although we also spotted a single Little Tern (*Sternula albifrons*), an endangered species in New South Wales, amongst a flock of other terns, as well as a lone Pacific Golden Plover and a Red Knot (Fig. 40). On the beach, between recreationists, a flock of Bar-tailed Godwits (*Limosa lapponica*) foraged for invertebrates just as they would on a remote beach. Out

in the bay, a pod of Common Bottlenose Dolphins (*Tursiops truncatus*) was also briefly seen.

Dharawal National Park's flowing creeks

On a rainy night, we headed to Darkes Forest, a rural town in the Illawarra region, just beyond the southern boundary of the Sydney region. The town has a small population and a history of commercial orchards dating back to the 1880's. Parking across the road from the town's last commercial orchard, we entered the Dharawal National Park to spotlight for frogs. The vicinity has previously been used as a frog study area (Lemckert and Shine 1993; Lemckert 2001a; Sherman et al. 2008; Lemckert and Grigg 2010). As we walked in, the calling of a Southern Boobook (*Ninox boobook*) and Tyler's Treefrogs (*Litoria tyleri*) provided an acoustic backdrop. Exploring a rocky stream above a waterfall, we found Lesueur's Frogs (*Ranoidea lesueurii*) by their strong eyeshines reflecting in our spotlight beams, and Smooth Sydney Crayfish (*Euastacus australasiensis*) in the clear water (Fig. 41). On the adjacent vegetation, there were Leaf Green Treefrogs, which, further into the Illawarra region, are replaced by the Southern Green Stream Frog (*Ranoidea nudidigitus*) that was previously considered the same species (Copland 1962). Eyeshine from the undergrowth



Fig. 41. A female Lesueur's Frog (*Ranoidea lesueurii*; left), two males (center), and a Smooth Sydney Crayfish (*Euastacus australasiensis*; right).



Fig. 42. A camouflaged Verreaux's Treefrog (*Litoria verreauxii*; left), and a Blue Mountains Treefrog (*Ranoidea citropa*) trading camouflage for a damp surface on which to lie (right).

revealed a Verreaux's Treefrog (*Litoria verreauxii*) blended into a bed of leaf litter and sticks (Fig. 42 left).

On a raised walkway leading to another stream, a Blue Mountains Treefrog (*Ranoidea citropa*) remained still (Fig. 42 right) even though we paused to observe it. We observed many more of this species further into the night, on the ground and in trees. Ever abundant Common Eastern Froglets called from rain-filled ditches nearby.

At another stream, we encountered a frog with a particularly wide leap compared to other frogs found in the Sydney region. This individual quickly disappeared into the undergrowth. Based on this locomotion, we suspected it was a Wallum Rocketfrog (*Litoria freycineti*), a species particularly associated with groundwater-dependent wetlands and low nutrient acidic soils (Filer et al. 2020). As we searched

the surrounding area, we found three Wallum Rocketfrogs, one of which we were able to observe in the hand for a close examination of its pointed snout, bumpy dorsum, and vivid coloration (Fig. 43). As we left the national park, with light rain still falling, a Bush Rat (*Rattus fuscipes*) ran out in front of us on the track.

Australia's Oldest National Park

The Royal National Park, Heathcote National Park, and Garawarra State Conservation Area are three park reserves managed by the New South Wales National Parks and Wildlife Service at the southern boundary of the Sydney metropolitan area (Treanor 2012). The largest is the Royal National Park, which covers 15,068 ha (Fig. 44). This national park was established in 1879, making it Australia's



Fig. 43. A Wallum Rocketfrog (*Litoria freycineti*) in the hand (left), and a daytime view of the heath woodland in which it was found (right).



Fig. 44. A view of the Royal National Park from the Princes Highway showing the broad expanse of natural habitat from west to east. Not visible in the photograph is the Pacific Ocean, which is behind the bushland that can be seen.



Fig. 45. A Botany Bay Cockroach (*Polyzosteria limbata*).



Fig. 46. A White's Skink (*Liopholis whitii*) sheltering in a rock crevice (A), a basking Red-throated Skink (*Acritoscincus platynotus*; B), an Eastern Stone Gecko (*Diplodactylus vittatus*; C), and an Eastern Bearded Dragon (*Pogona barbata*) exhibiting its defensive posture (D).

first national park (Adam 2012), and the world's second national park, preceded only by Yellowstone National Park in the United States of America. Apart from its historical significance, the Royal National Park is also ecologically and recreationally significant in the diverse ecosystems and biodiversity that have been spared from Sydney's urban sprawl (Ramp et al. 2006; Bilney et al. 2007; Hayes and Goldingay 2012; Badiane 2017). A comprehensive survey of herpetofauna, bird and mammal taxa in the Royal National Park that was published 10 years ago found 283 species, of which 42 species were reptiles and 15 species were frogs (Schulz and Magarey 2012).

Embarking on one walk through dry sclerophyll forest and heathland, the first animal we encountered was a Botany Bay Cockroach (*Polyzosteria limbata*; Fig. 45), a large native cockroach quite unlike the household pests that most people affiliate with the word 'cockroach.' This individual was approximately 6 cm, and slowly moving across a sandy section of walking track when we spotted it. The walking track also passed through rocky outcrops where we observed White's Skinks (*Liopholis whitii*), a Red-throated Skink (*Acritoscincus platynotus*), an Eastern Stone Gecko (*Diplodactylus vittatus*), and an Eastern Bearded Dragon (*Pogona barbata*) (Fig. 46). The Eastern Bearded Dragon was a welcome find being an agamid that has declined in the built-up areas of Sydney despite being generally common throughout their range (Shea 2010). There were also Eastern Water Skinks, Greater Bar-

sided Skinks, Dark-flecked Garden Sunskinks, Eastern Blue-tongued Skinks, Eastern Water Dragons, and a Spotted Grass Frog (*Limnodynastes tasmaniensis*) that leapt into a clear stream from a basking location and hastily took refuge beneath some sedges. Birdlife was also abundant, especially Rainbow Lorikeets and New Holland Honeyeaters. The walk also provided good views of White-headed Pigeons (*Columba leucomela*), Australian King-parrots, Crimson Rosellas, Eastern Yellow Robins, Red-browed Firetail Finches, Superb Fairywrens, Eastern Spinebills, and Little Wattlebirds (*Anthochaera chrysoptera*), and a fleeting glimpse of a Diamond Firetail Finch (*Stagonopleura guttata*) (Fig. 47). Part of the walking track opened up to a clearing where a Swamp Wallaby, the largest marsupial in the national park, grazed on grasses (Fig. 48 left).

Spotlighting at night, we stumbled upon a herd of Javan Rusa Deer (*Rusa timorensis*). Usually we would first notice them by hearing them trample away through the vegetation, however on this occasion, the herd of at least 30 deer were stationary, and the glow of so many eyes was illuminated in the spotlight beams. Deer are among a number of introduced mammals in Australia (Moriarty 2004; Davis et al. 2016), and this population of deer originate from a captive herd that was released onto a fenced peninsula in 1906, but escaped by swimming off the peninsula (NSW Department of Environment and Conservation 2005). Their descendants still captivate park visitors but at the cost of ecological

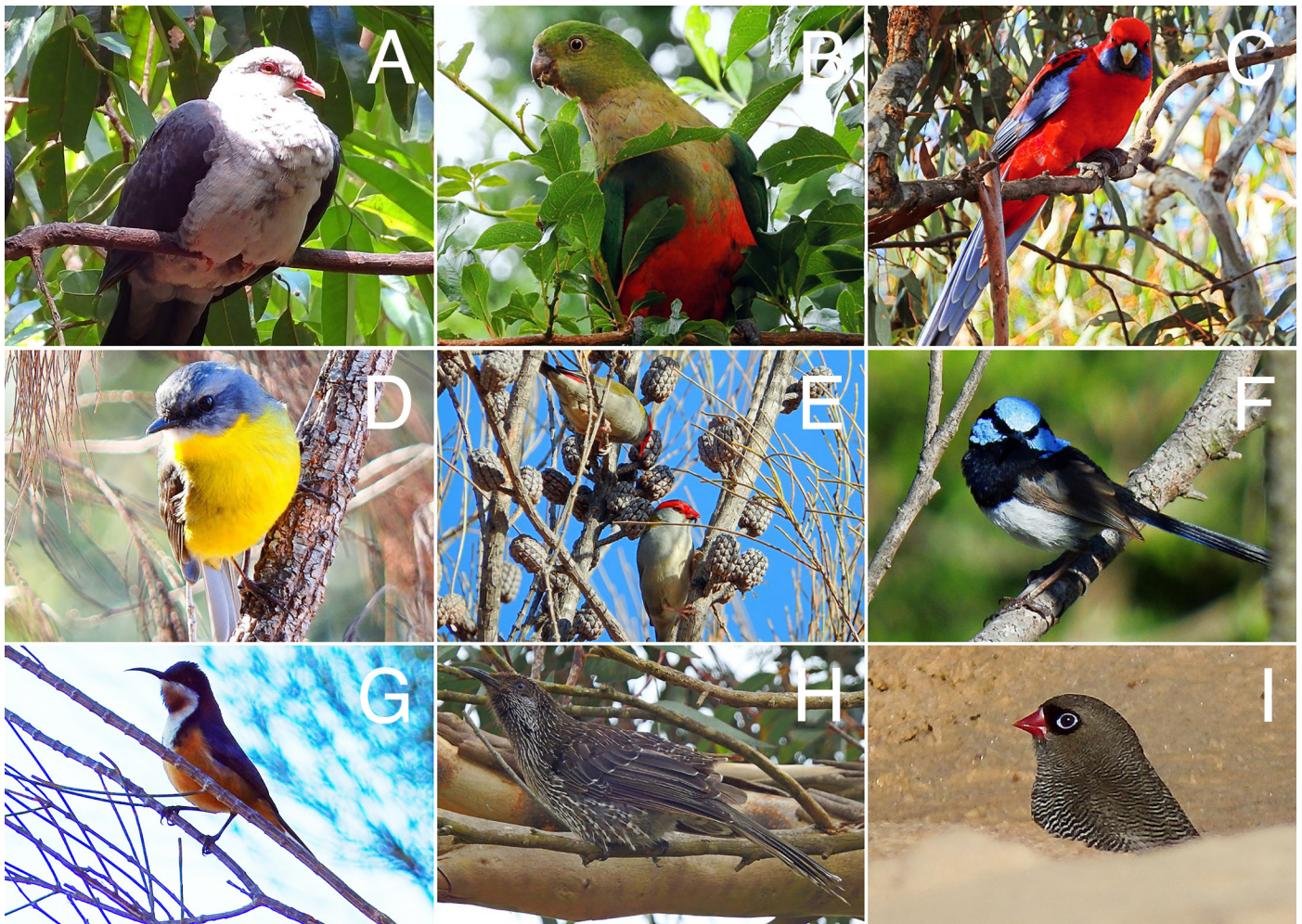


Fig. 47. Some of the birdlife of the Royal National Park: a White-headed Pigeon (*Columba leucomela*; A), a female Australian King-parrot (*Alisterus scapularis*; B), a Crimson Rosella (*Platycercus elegans*) moments before taking off (C), a fast-moving Eastern Yellow Robin (*Eopsaltria australis*; D), foraging Red-browed Firetail Finches (*Neochmia temporalis*; E), a male Superb Fairy-wren (*Malurus cyaneus*; F), an Eastern Spinebill (*Acanthorhynchus tenuirostris*) in the shadows (G), a Little Wattlebird (*Anthochaera chrysoptera*; H), and a momentarily glimpse of a Diamond Firetail Finch (*Stagonopleura guttata*) descending on a rain puddle (I).

impacts, mainly consuming native vegetation and ringbarking trees (Keith and Pellow 2005). Local residents and businesses have lost cultivated plants (Burgin et al. 2015) and the deer pose a danger to motorists when the deer stray onto roads (Ramp et al. 2006). Usually deer we encounter would retreat but this herd, confident in their numbers, stood their ground as we observed them, still in place when we moved off.

Before we encountered any reptiles or frogs on this evening walk, we observed a Short-beaked Echidna (*Tachyglossus aculeatus*) feeding on ants near a signpost. Upon our approach, the echidna dug its head and soft underparts beneath the ground (Fig. 48 right) as per its usual defense against predators (Augee et al. 2006).

As we walked around some rocky outcrops, we illuminated some Lesueur's Velvet Geckos. In these parts, they are the main prey for one of the species we have long desired to encounter in the wild, the Broad-headed Snake (*Hoplocephalus bungaroides*; Webb and Shine 1998; Webb et

al. 2003), an icon of threatened herpetofauna endemic to the Sydney Basin (Penman et al. 2010). This snake is listed as vulnerable under the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Webb et al. 2018) and endangered under New South Wales environmental legislation (Newell and Goldingay 2005). We did however encounter another elapid, an Eastern Small-eyed Snake (*Cryptophis nigrescens*), which was beside the walking track (Fig. 49). This elapid has nocturnal habits, and mainly feeds on lizards (Shine 1984). In nearby rain-filled ditches, several Common Eastern Froglets and a Peron's Tree Frog serenaded the night.

In a clearing surrounded by heathland, we heard the distinctive call of a Red-crowned Toadlet (*Pseudophryne australis*), another Sydney Basin endemic, which is listed as vulnerable by the IUCN with a decreasing population trend (Hero et al. 2004a). With the help of some friends accompanying us, we attempted to triangulate the location of the frog, but this one



Fig. 48. Two mammals of the Royal National Park: a Swamp Wallaby (*Wallabia bicolor*) in a clearing (left), and a Short-beaked Echidna (*Tachyglossus aculeatus*) demonstrating its defensive posture (right).

proved difficult. Later in the night though, we were fortunate to happen upon a Red-crowned Toadlet in clear view (Fig. 50). The colors were as vivid as we had seen in photographs. Some people may be able to land regular encounters with this species, but we considered this sighting a rare privilege.

We had desired to find a Giant Burrowing Frog (*Heleioporus australiacus*), a distinctively large frog by Australian standards that is currently listed as a vulnerable species on the IUCN Red List of Threatened Species (Hero et al. 2004b). We felt that the recent rainfall over consecutive days, including the heavy downpour that fell immediately before we headed out for the evening, gave us a fair chance. We shone our spotlights for hours, uncovering a range of insects, spiders, more deer and wallabies, common species of frogs, and even reached close enough to the coast on one

walking track that we could hear the Pacific Ocean pounding against the national park's sea cliffs. Prepared to give up, we turned around to walk ~10–12 km back to our vehicle, though we kept spotlighting both sides of the track. One of our spotlight beams found itself fixed upon a large set of eyes that gave away the location of a male Giant Burrowing Frog (Fig. 51). The frog was in heathland that was fairly open, which was probably an important factor that enabled us to detect it. The largely purplish pigmentation was a stunningly good color to accompany the reddish sandy and rocky surroundings. We could tell it was a mature male by the enlarged musculature of the forearms, prominent black conical spines on the thumbs and second and third fingers (Barker et al. 1995), which scientists believe are for territorial combat or self-defense (Lemckert 2001b).



Fig. 49. A small but highly venomous Eastern Small-eyed Snake (*Cryptophis nigrescens*).



Fig. 50. The impressive coloration of the Red-crowned Toadlet (*Pseudophryne australis*).



Fig. 51. A Giant Burrowing Frog (*Heleioporus australiacus*; left), and a late afternoon view of the coastal heathland it was found in (right).

Readers may notice we have not disclosed the locations of any of our walks through the Royal National Park. This is deliberate for the purpose of safeguarding the locations of the threatened species we were privileged to find. To say the Red-crowned Toadlet and Giant Burrowing Frog generated excitement was an understatement. What a way to conclude a period of wildlife spotting, even when the world situation prevented us from travelling far from home.

Literature Cited

- Adam, P. 2012. Royal National Park – lessons for the future from the past. *Proceedings of the Linnean Society of New South Wales* 134: B7–B24.
- Augee, M., B. Gooden, and A. Musser. 2006. *Echidna: Extraordinary Egg-laying Mammal*. CSIRO Publishing, Melbourne, Australia.
- Badiane, A. 2017. Predation on an Eastern Water Dragon (*Intelligama lesueurii*) by a Heath Monitor (*Varanus rosenbergi*) in Royal National Park, Australia. *Herpetology Notes* 10: 339.
- Bamford, M. and M.C. Calver. 2012. Cat predation and suburban lizards: a 22-year study at a suburban Australian property. *Open Conservation Biology Journal* 6: 25–29. <https://doi.org/10.2174/1874839201206010025>.
- Barker, R.D. and W.J.M. Vestjens. 1989. *The Food of Australian Birds. I. Non-passerines*. CSIRO Division of Wildlife, Canberra, Australia.
- Barker, J., G.C. Grigg, and M.J. Tyler. 1995. *A Field Guide to Australian Frogs*. Surrey Beatty and Sons, Sydney.
- Bavor, H.J., P. Adcock, G. Sainty, and P.L. Osborne. 1995. Stage 1 report: rehabilitation and development plan for a freshwater complex at Lime Kiln Bay, Oatley – water quality and wetland evaluation. Report prepared for Hurstville City Council. Water Research Laboratory, University of Western Sydney, Richmond, NSW, Australia.
- Benson, D. and G. Eldershaw. 2007. Backdrop to encounter: the 1770 landscape of Botany Bay, the plants collected by Banks and Solander and rehabilitation of natural vegetation at Kurnell. *Cunninghamia* 10: 113–137.
- Bilney, R.J., R.P. Kavanagh, and J.M. Harris. 2007. Further observations on the diet of the Sooty Owl *Tyto tenebriosa* in the Royal National Park, Sydney. *Australian Field Ornithology* 24: 64–69.
- Blomberg, S.P. and R. Shine. 2000. Size-based predation by kookaburras (*Dacelo novaeguineae*) on lizards (*Eulamprus tympanum*: Scincidae): what determines prey vulnerability? *Behavioral Ecology and Sociobiology* 48: 484–489. <https://doi.org/10.1007/s002650000260>.
- Burgin, S. 2006. Confirmation of an established population of exotic turtles in urban Sydney. *Australian Zoologist* 33: 379–384. <https://doi.org/10.7882/AZ.2006.011>.
- Burgin, S., M. Mattila, D. McPhee, and T. Hundloe. 2015. Feral deer in the suburbs: an emerging issue for Australia? *Human Dimensions of Wildlife* 20: 65–80. <https://doi.org/10.1080/10871209.2015.953274>.
- Copland, S.J. 1962. *Hyla phyllochrous* Günther (Amphibia) as an addition to the fauna of Victoria, with the description of a new race and a note on the name of the genus. *Proceedings of the Linnean Society of New South Wales* 87: 137–140.
- Davis, N.E., A. Bennett, D.M. Forsyth, D.M.J.S. Bowman, E.C. Lefroy, S.W. Wood, A.P. Woolnough, P. West, J.O. Hampton, and C.N. Johnson. 2016. A systematic review of the impacts and management of introduced deer (family Cervidae) in Australia. *Wildlife Research* 43: 515–532. <https://doi.org/10.1071/WR16148>.
- Doody, J.P. 2013. *Sand Dune Conservation, Management and Restoration*. Coastal Research Library, volume 4. Springer, Dordrecht, The Netherlands. https://doi.org/10.1007/978-94-007-4731-9_2.
- Doughty, P. and R. Shine. 1995. Life in two dimensions: natural history of the Southern Leaf-tailed Gecko, *Phyllurus platurus*. *Herpetologica* 51: 193–201.
- Eymann, J., C.A. Herbert, and D.W. Cooper. 2006. Management issues of urban Common Brushtail Possums *Trichosurus vulpecula*: a loved or hated neighbour. *Australian Mammalogy* 28: 153–171. <https://doi.org/10.1071/AM06025>.
- Fenner, A.L., C.M. Bull, and M.N. Hutchinson. 2008. Injuries to lizards: conservation implications for the endangered Pygmy Bluetongue Lizard (*Tiliqua adelaidensis*). *Wildlife Research* 35: 158–161. <https://doi.org/10.1071/WR07103>.
- Filer, A., H.L. Beyer, E. Meyer, and B.J. Van Rensburg. 2020. Distribution mapping of specialized amphibian species in rare, ephemeral habitats: implications for the conservation of threatened “acid” frogs in south-east Queensland. *Conservation Science and Practice* 2: e143. <https://doi.org/10.1111/csp2.143>.
- Hall, C.M., J.B. Fontaine, K.A. Bryant, and M.C. Calver. 2015. Assessing the effectiveness of the Birdsbesafe® anti-predation collar cover in reducing predation on wildlife by pet cats in Western Australia. *Applied Animal Behaviour Science* 173: 40–51. <https://doi.org/10.1016/j.applanim.2015.01.004>.
- Hamilton, R. and D. Penny. 2015. Ecological history of Lachlan Nature Reserve, Centennial Park, Sydney, Australia: a palaeoecological approach to conservation. *Environmental Conservation* 42: 84–94. <https://doi.org/10.1017/S0376892914000083>.
- Hayes, I.F. and R.L. Goldingay. 2012. Visitors’ knowledge of the Broad-headed Snake in Royal National Park. *Proceedings of the Linnean Society of New South Wales* 134: B135–B146.
- Hero, J., F. Lemckert, P. Robertson, H. Cogger, and M. Littlejohn. 2004a. *Pseudophryne australis*. The IUCN Red List of Threatened Species 2004: e.T18583A8486801. <https://doi.org/10.2305/IUCN.UK.2004.RLTS.T18583A8486801.en>.
- Hero, J., F. Lemckert, G. Gillespie, P. Robertson, and M. Littlejohn. 2004b. *Heleioporus australiacus*. The IUCN Red List of Threatened Species 2004: e.T41046A10393601. <https://doi.org/10.2305/IUCN.UK.2009.RLTS.T41046A10393601.en>.
- Hu, Y., G. Gillespie, and T.S. Jessop. 2019. Variable reptile responses to introduced predator control in southern Australia. *Wildlife Research* 46: 64–75. <https://doi.org/10.1071/WR18047>.
- Keith, D. and B. Pellow. 2005. Effects of Javan Rusa Deer (*Cervus timorensis*) on native plant species in the Jibbon-Bundeena area, Royal National Park, New

- South Wales. *Proceedings of the Linnean Society of New South Wales* 126: 99–110.
- Körtner, G. and F. Geiser. 1999. Roosting behaviour of the Tawny Frogmouth (*Podargus strigoides*). *Journal of Zoology* 248: 501–507. <https://doi.org/10.1111/j.1469-7998.1999.tb01049.x>.
- Lemckert, F. 2001a. The influence of micrometeorological factors on the calling activity of the frog *Crinia signifera* (Anura: Myobatrachidae). *Australian Zoologist* 31: 625–631. <https://doi.org/10.7882/AZ.2001.009>.
- Lemckert, F. 2001b. Digging up the dirt on the Giant Burrowing Frog. *Australian Nature* 27: 26–33.
- Lemckert, F. and G. Grigg. 2010. Living in the 80s – seasonality and phenology of frog calling activity at Darkes Forest from 1987–1989. *Australian Zoologist* 35: 245–250. <https://doi.org/10.7882/AZ.2010.013>.
- Lemckert, F.L. and R. Shine. 1993. Costs of reproduction in a population of the frog *Crinia signifera* (Anura: Myobatrachidae) from southeastern Australia. *Journal of Herpetology* 27: 420–425. <https://doi.org/10.2307/1564830>.
- Little, D., P. Stevens, G. Gatenby, and V. O'Brien. 2010. Fauna of the Wolli Valley in inner south-west Sydney, pp. 326–331. In: D. Lunney, P. Hutchings, and D. Hochuli (eds.), *The Natural History of Sydney*. Royal Zoological Society of New South Wales, Sydney, Australia. <http://doi.org/10.7882/FS.2010.027>.
- Liu, Z., C. He, and J. Wu. 2016. The relationship between habitat loss and fragmentation during urbanization: an empirical evaluation from 16 World Cities. *PLoS ONE* 11: e0154613. <https://doi.org/10.1371/journal.pone.0154613>.
- Madden, B., and L. Muir. 1996. *The Wolli Creek Valley – A History of Survival*. Wolli Creek Preservation Society, Sydney, Australia.
- Matthews, A., D. Lunney, K. Waples, and J. Hardy. 2004. Brushtail possums: “Champion of the suburbs” or “Our tormentors”? pp. 159–168. In: D. Lunney and S. Burgin (eds.), *Urban Wildlife: More than Meets the Eye*. Royal Zoological Society of New South Wales, Sydney, Australia. <https://doi.org/10.7882/FS.2004.093>.
- McFadden, M.S., P. Topham, and P.S. Harlow. 2017. A ticking time bomb: Is the illegal pet trade a pathway for the establishment of Corn Snake (*Elaphe guttata*) populations in Australia? *Australian Zoologist* 38: 499–504. <https://doi.org/10.7882/AZ.2017.006>.
- Mo, M. 2012. An account of a Greater Bar-sided Skink *Eulamprus tenuis* trapped in a narrow crevice opening. *Herpetofauna* 42: 11–14.
- Mo, M. 2014. Habitat selection of the Broad-tailed Gecko *Phyllurus platurus* in an urban Sydney bushland remnant. *Australian Zoologist* 37: 95–101. <https://doi.org/10.7882/AZ.2014.002>.
- Mo, M. 2015. Herpetofaunal community of the constructed Lime Kiln Bay Wetland, south Sydney. *Victorian Naturalist* 132: 64–72.
- Mo, M. 2018. Additions to the herpetofauna of the Lime Kiln Bay Wetland, southern Sydney. *Victorian Naturalist* 135: 53–57.
- Mo, M. 2019a. Predation of lizards by the White-faced Heron *Egretta novaehollandiae*. *Australian Field Ornithology* 36: 95–96. <https://doi.org/10.20938/af036095096>.
- Mo, M. 2019b. Red-eared Sliders *Trachemys scripta elegans* in southern Sydney, including new incursions. *Australian Zoologist* 40: 314–325. <https://doi.org/10.7882/AZ.2018.022>.
- Mo, M. 2019c. Occurrence of the Eastern Barn Owl *Tyto alba delicatula* in the Centennial Parklands, Sydney. *Australian Field Ornithology* 36: 56–59. <https://doi.org/10.20938/af036056059>.
- Mo, M. 2019d. Are Noisy Miners getting gamier with people? *Victorian Naturalist* 136: 211–212.
- Mo, M. 2019e. Changes in Nankeen Kestrel *Falco cenchroides* breeding success at a nest-hollow after more than a decade. *Australian Field Ornithology* 36: 137–140. <https://doi.org/10.20938/af036137140>.
- Mo, M. 2020a. Two instances of tail regeneration and one case of tail bifurcation in adult Eastern Blue-tongued Lizards (*Tiliqua scincoides scincoides*) in Australia. *Reptiles & Amphibians* 27: 485–486. <https://doi.org/10.17161/ra.v27i3.14889>.
- Mo, M. 2020b. Repetitive confrontations between Australian Ravens (*Corvus coronoides*) and lone Australasian Darters (*Anhinga novaehollandiae*). *Ornithology Research* 28: 181–184. <https://doi.org/10.1007/s43388-020-00022-1>.
- Mo, M. 2020c. Long-term pairing of two domesticated ducks now living wild: a Muscovy Duck *Cairina moschata* and a Mallard *Anas platyrhynchos*. *Victorian Naturalist* 137: 22–24.
- Mo, M. and D.R. Waterhouse. 2015a. Development of independence in Powerful Owl *Ninox strenua* fledglings in suburban Sydney. *Australian Field Ornithology* 32: 143–153.
- Mo, M. and D.R. Waterhouse. 2015b. Aspects of the breeding biology of the Australasian Grebe (*Tachybaptus novaehollandiae*) in urban wetlands. *Waterbirds* 38: 296–301. <https://doi.org/10.1675/063.038.0310>.
- Mo, M. and D.R. Waterhouse. 2015c. Responses of brooding Australasian Grebes *Tachybaptus novaehollandiae* to other waterbirds. *Australian Field Ornithology* 32: 176–182.
- Mo, M. and D.R. Waterhouse. 2016. Chick-brooding by White-headed Stilts *Himantopus leucocephalus*. *Stilt* 69–70: 80–81.
- Mo, M. and D.R. Waterhouse. 2020. Copulation, interspecific aggression and other observed behaviours in a breeding pair of Australian Eurasian Coots *Fulica atra australis* on a small urban wetland. *Australian Field Ornithology* 37: 100–104. <https://doi.org/10.20938/af037100104>.
- Mo, M. and D.R. Waterhouse. 2021. Variations in defensiveness of a nesting raptor based on the number of human observers near the nest. *Ornithology Research* 29: 76–78. <https://doi.org/10.1007/s43388-021-00053-2>.
- Mo, M. and P. Hayler. 2015. An incident near a Powerful Owl nest site: the event in hindsight. *Boobook* 33: 46–47.
- Mo, M. and R. Oliver. 2020. Managing non-releasable animals following rehabilitation: the current management framework in New South Wales, recent trends and a stakeholder consultative review. *Australian Zoologist* 40: 58–73. <https://doi.org/10.7882/AZ.2020.013>.
- Mo, M., D.R. Waterhouse, P. Hayler, and A. Hayler. 2016a. Observations of mobbing and other agonistic responses to the Powerful Owl *Ninox strenua*. *Australian Zoologist* 38: 43–51. <https://doi.org/10.7882/AZ.2015.033>.
- Mo, M., P. Hayler, D.R. Waterhouse, and A. Hayler. 2016b. Observations of hunting attacks by the Powerful Owl *Ninox strenua* and an examination of search and attack techniques. *Australian Zoologist* 38: 52–58. <https://doi.org/10.7882/AZ.2015.028>.
- Mo, M., P. Hayler, and A. Hayler. 2016c. Fish-catching by a juvenile Powerful Owl *Ninox strenua*. *Australian Field Ornithology* 33: 112–115. <https://doi.org/10.20938/af033112115>.
- Mo, M. and E. Mo. 2021a. Prey dismemberment in the feeding behavior of the Australian skinks *Lampropholis delicata* and *L. guichenoti* (Squamata: Scincidae). *Phyllomedusa* 20: 181–184. <https://doi.org/10.11606/issn.2316-9079.v20i2p181-184>.
- Mo, M. and E. Mo. 2021b. An amelanistic Red Cornsnake (*Pantherophis guttatus*) as a possible identity for an unusual road-killed snake discovered in Sydney, Australia. *Reptiles & Amphibians* 28: 480–482. <https://doi.org/10.17161/ra.v28i3.15874>.
- Mo, M., P. Hayler, A. Hayler, and D.R. Waterhouse. 2017. Predation on small passerines by the Spangled Drongo *Dicrurus bracteatus*. *Australian Zoologist* 38: 547–551. <https://doi.org/10.7882/AZ.2016.035>.
- Mo, M., P. Hayler, and A. Hayler. 2015. Male combat in the Powerful Owl *Ninox strenua*. *Australian Field Ornithology* 32: 190–200.
- Mo, M., P. Hayler, and A. Hayler. 2020a. Observations of Australian Red-bellied Blacksnakes (*Pseudechis porphyriacus*) preying on freshwater eels. *Reptiles & Amphibians* 27: 91–93. <https://doi.org/10.17161/ra.v27i1.14471>.
- Mo, M., M. Roache, R. Williams, I.N. Drinnan, and B. Noël. 2020b. From cleared buffers to camp dispersal: mitigating impacts of the Kareela flying-fox camp on adjacent residents and schools. *Australian Zoologist* 41: 19–41. <https://doi.org/10.7882/AZ.2020.002>.
- Mo, M., M. Roache, J. Davies, J. Hopper, H. Pitty, N. Foster, S. Guy, K. Parry-Jones, G. Francis, A. Koosmen, L. Colefax, C. Costello, J. Stokes, S. Curran, M. Smith, G. Daly, C. Simmons, R. Hansen, D. Prophet, S. Judge, F. Major, T. Hogarth, C. McGarry, L. Pope, S. Brend, D. Coxon, K. Baker, K. Kaye, L. Collins, M. Wallis, R. Brown, L. Roberts, S. Taylor, T. Pearson, T. Bishop, P. Dunne, K. Coutts-McClelland, L. Oliver, C. Dawe, and J.A. Welbergen. 2022. Estimating flying-fox mortality associated with abandonments of pups and extreme heat events during the austral summer of 2019–20. *Pacific Conservation Biology* 28: 124–139. <https://doi.org/10.1071/PC21003>.
- Moriarty, A. 2004. The liberation, distribution, abundance and management of wild deer in Australia. *Wildlife Research* 31: 291–299. <https://doi.org/10.1071/WR20169>.
- Newell, D.A. and R.L. Goldingay. 2005. Distribution and habitat assessment of the Broad-headed Snake *Hoplocephalus bungaroides*. *Australian Zoologist* 33: 168–179. <https://doi.org/10.7882/AZ.2005.013>.
- NSW Department of Environment and Conservation. 2005. Deer Management

- Plan 2005–2008 for Royal National Park and NPWS parks and reserves in the Sydney South Region. NSW Department of Environment and Conservation, and the Royal National Park Deer Working Group, Sydney, Australia.
- Payne, A. 2014. Observations on the calling behaviour of the Jervis Bay Tree Frog *Litoria jervisiensis*. *Australian Zoologist* 37: 263–266. <https://doi.org/10.7882/AZ.2014.017>.
- Penman, T.D., D.A. Pike, J.K. Webb, and R. Shine. 2010. Predicting the impact of climate change on Australia's most endangered snake, *Hoplocephalus bungaroides*. *Diversity and Distributions* 16: 109–118. <https://doi.org/10.1111/j.1472-4642.2009.00619.x>.
- Peters, R. 2020. Reflections on COVID-19 in Sydney. *City and Society (Washington, D.C.)* 32: 12267. <https://doi.org/10.1111/ciso.12267>.
- Praharaj, S., D. King, C. Pettit, and E. Wentz. 2020. Using aggregated mobility data to measure the effect of COVID-19 policies on mobility changes in Sydney, London, Phoenix, and Pune. *Findings*, October. <https://doi.org/10.32866/001c.17590>.
- Ramp, D., V.K. Wilson, and D.B. Croft. 2006. Assessing the impacts of roads in peri-urban reserves: road-based fatalities and road usage by wildlife in the Royal National Park, New South Wales, Australia. *Biological Conservation* 129: 348–359. <https://doi.org/10.1016/j.biocon.2005.11.002>.
- Rauscher, R.C. and S. Momtaz. 2017. Planning Greater Sydney districts – St George case study, pp. 301–328. In: R.C. Rauscher and S. Momtaz (eds.), *Cities in Global Transition: Creating Sustainable Communities in Australia*. Springer, Cham, Switzerland. https://doi.org/10.1007/978-3-319-39865-5_17.
- Robey, J., S. Burgin, D. Hitchen, and G. Ross. 2011. Status of an urban feral Red-Eared Slider (*Trachemys scripta elegans*) population in Sydney a decade on. *Australian Zoologist* 35: 822–825. <https://doi.org/10.7882/AZ.2011.033>.
- Rose, A.B. 1997. Notes on the diet of swifts, kingfishers and allies in eastern New South Wales. *Australian Bird Watcher* 17: 203–210.
- Rose, A.B. 1999. Notes on the diet of some passerines in New South Wales 1: fairy-wrens to woodswallows. *Australian Bird Watcher* 18: 106–120.
- Schulz, M. and Magarey, E. 2012. Vertebrate fauna: a survey of Australia's oldest national park and adjoining reserves. *Proceedings of the Linnean Society of New South Wales* 134: B215–B247.
- Shea, G.M. 2010. The suburban terrestrial reptile fauna of Sydney – winners and losers, pp. 154–197. In: D. Lunney, P. Hutchings, and Dieter Hochuli (eds.), *The Natural History of Sydney*. Royal Zoological Society of New South Wales, Sydney, Australia. <https://doi.org/10.7882/FS.2010.015>.
- Sherman, C.D.H., E. Wapstra, T. Uller, and M. Olsson. 2008. Male and female effects on fertilization success and offspring viability in the Peron's Treefrog, *Litoria peronii*. *Austral Ecology* 33: 348–352. <https://doi.org/10.1111/j.1442-9993.2007.01823.x>.
- Shine, R. 1984. Reproductive biology and food habits of the Australian elapid snakes of the genus *Cryptophis*. *Journal of Herpetology* 18: 33–39. <https://doi.org/10.2307/1563669>.
- Stobo-Wilson A.M., B.P. Murphy, S.M. Legge, D.G. Chapple, H.M. Crawford, S.J. Dawson, C.R. Dickman, T.S. Doherty, P.A. Fleming, M. Gentle, T.M. Newsome, R. Palmer, M.W. Rees, E.G. Ritchie, J. Speed, J. Stuart, E. Thompson, J. Turpin, and J.C.Z. Woinarski. 2021. Reptiles as food: predation of Australian reptiles by introduced Red Foxes compounds and complements predation by cats. *Wildlife Research* 48: 470–480. <https://doi.org/10.1071/WR20194>.
- Treanor, M.B. 2012. Natural history in the Royal National Park and the need to better integrate research into park management. *Proceedings of the Linnean Society of New South Wales* 134: B3–B6.
- Webb J.K. and R. Shine. 1998. Ecological characteristics of a threatened snake species, *Hoplocephalus bungaroides* (Serpentes, Elapidae). *Animal Conservation* 1: 185–193. <https://doi.org/10.1111/j.1469-1795.1998.tb00028.x>.
- Webb, J., A. Fenner, G. Shea, H. Cogger, and M. Greenlees. 2018. *Hoplocephalus bungaroides*. The IUCN Red List of Threatened Species 2018: e.T10246A83770106. <https://doi.org/10.2305/IUCN.UK.2018-1.RLTS.T10246A83770106.en>.
- Webb, J.K., B.W. Brook, and R. Shine. 2003. Does foraging mode influence life history traits? A comparative study of growth, maturation and survival of two species of sympatric snakes from south-eastern Australia. *Austral Ecology* 28: 601–610. <https://doi.org/10.1046/j.1442-9993.2003.t01-1-01316.x>.
- White, A.W. 2008. May I touch that frog? pp. 45–48. In: D. Lunney, A. Munn, and W. Meikle (eds.), *Too Close for Comfort: Contentious Issues in Human-wildlife Encounters*. Royal Zoological Society of New South Wales, Sydney, Australia. <https://doi.org/10.7882/FS.2008.008>.
- White, A.W. 2010. The natural history of western Botany Bay, pp. 402–414. In: D. Lunney, P. Hutchings, and D. Hochuli (eds.), *The Natural History of Sydney*. Royal Zoological Society of New South Wales, Sydney, Australia. <https://doi.org/10.7882/FS.2010.031>.
- White, A.W. and S. Burgin. 2004. Current status and future prospects of reptiles and frogs in Sydney's urban-impacted bushland reserves, pp. 109–123. In: D. Lunney and S. Burgin (eds.), *Urban Wildlife: More than Meets the Eye*. Royal Zoological Society of New South Wales, Sydney, Australia. <https://doi.org/10.7882/FS.2004.087>.
- Wolli Creek Preservation Society. 2006. *Neil Rankin's Birds of Wolli Valley*. Wolli Creek Preservation Society, Sydney, Australia.