



Baigup Local Residents Fauna Survey Report

SNRM Community Action Grant: Project A16045

Penny Lee and Michael Clarke

Baigup Wetland Interest Group, January 2018



Photos by
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natural resource
management program



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Introduction and background

Location and Management

Baigup Wetlands is 16.4 hectare nature reserve on the Swan River flood plain. It extends about one kilometer downstream from Garratt Road Bridge to where the houses begin in Swan View Terrace at the foot of Kelvin Street. Houses on the south side of Stone street and west side of Garratt Road also share a border with Baigup. Approximately two thirds of Baigup Wetlands is in Bayswater and comprises freehold land owned by the Western Australian Planning Commission (WAPC). This area, together with a small area of Unallocated Crown Reserve on the edge of the river and the Swan Lake Main Drain easement which enters below the Water Corporation block in Stone Street, together make up the 11.2 ha currently managed by the Department of Planning, Lands, and Heritage (DPLH). The Maylands section of Baigup is a Crown Reserve managed by the City of Bayswater (COB). Crown Reserves are areas of land owned by the State and set aside for recreation, conservation of flora and fauna, protection of water sources, etc.

According to Landgate records, the name 'Baigup', meaning 'rushes' in the Noongar language, was formally recognized for the reserve as a whole in 2003 after being initially recommended by consultants Regeneration Technology in 1994. Prior to that the area was referred to as the 'Garratt Road Wetlands' or the 'Swan River Saltmarshes'. The two lakes were constructed in 2000 and 2001 respectively: the Primary Lake in Bayswater through swamps and marshes traversed by the Swan Lake Main Drain to the river and the Secondary Lake in Maylands in an extensive weedy area below the houses. The gas pipeline was installed in 1986 with its access track retained by public demand as a dual purpose walkway/cycle path. Deep sewerage was installed across the back of the reserve below the houses in 1989. A major storm water drain, the Swan Lake Main Drain, which runs from the Water Corporation pumping station in Stone Street to the river, was probably constructed early in the 20th century (?). The Primary Lake was excavated in the area through which the drain ran in an effort to improve the quality of water travelling through to the river.

Protected status

Baigup Wetlands is listed nationally as an increasingly rare example of a *Temperate Coastal Saltmarsh Threatened Ecological Community* (TEC). It is also part of *Bush Forever Site* 313 which includes both sides of the river from the end of Maylands Peninsula to Garratt Road Bridge. Being part of the Swan River floodplain, with its rich and ancient cultural heritage, Baigup is also a recognised site of continuing significance for the Noongar people of Western Australia's Southwest.

Following Questions in the State Parliament Lower House by Local Member for Maylands Lisa Baker in October 2016, the Answers from the then Minister for the Environment included the information that the then Department of Planning had taken back management of the WAPC land and, when appropriate works had been done the Bayswater section, this part of Baigup would be incorporated into the existing Crown Reserve on the Maylands side of the border. Management would then be

transferred back to COB. It is understood that Baigup Wetlands would then become an A Class Reserve for the purposes of conservation of flora and fauna and passive recreation.

Local environment group

Baigup Wetland Interest Group (BWIG) was set up at the end of 2012 and has played an active role in helping to protect and preserve Baigup Wetlands since then. The group enjoys good working relationships with COB and DPLH managers. BWIG organizes planting and weeding events, workshops, and other occasional events for members of the local community. The group also works with other volunteer groups to help maintain the reserve, for instance Conservation Volunteers (CVA) and Curtin Volunteers! being the main groups during 2017.

In recent years, BWIG has successfully applied for several government grants to support and extend the work of the reserve managers. Between 2015 and 2017 the grant funding contribution was roughly equivalent to the investment in Baigup made by COB. *Swan Canning River Recovery Project* (SCRRP) and *Swan Alcoa Landcare Project* (SALP) grants enabled *Typha orientalis* (bulrushes) to be cleared from the Secondary Lake and other sections of the Crown Reserve and also paid for seedlings and other weed removal. BWIG also alerted COB to a funds available through the Perth Federal Electorate which, when matched by COB, enabled the walkway/cycle path through Baigup to be repaired and resealed in 2016.

Context of the Local Residents Survey

This survey was part of a larger fauna study project funded by State Natural Resources Management (SNRM) in 2017/18. The project was entitled *Maximizing Fauna Diversity in Baigup Restoration Management*. The grant paid for a professional fauna survey by consultants *Natural Area* (NA) and supported various other related activities. As part of a very substantial 'in kind' contribution to the overall project, BWIG organized a series of events for members of the local community. These began with a workshop where Whadjuk Noongar Elders shared information and stories about their heritage in relation to the river environment. Representatives from NA then demonstrated the equipment to be used during the professional fauna survey and explained the regulations and procedures relating to trapping and sampling wildlife. BWIG also organized a well received night walk through Baigup.

Partners in the project included *BirdLife Western Australia* (BLWA) which supplied up to date information about birds recorded on their database for the Baigup area since mid 2012. COB, DPLH, Department of Biodiversity, Conservation and Attractions (DBCA) and CVA were also partners in the fauna project.

The purpose of the survey carried out by BWIG was to develop a better understanding of local knowledge, opinions and values about Baigup. Baigup Wetland Interest Group sincerely thanks local residents who took the time to share their observations and thoughts as part of the Baigup Fauna Project funded by SNRM. We hope you find this report of interest.

Previous community surveys

Local people were last surveyed in relation to Baigup in 1991 and 1994. Those surveys had different and broader aims. The foundational 1991 survey of 50 local residents was part of a more comprehensive research project by three University of Western Australia Third Year *Environmental Management* students (Siemon et al. 1991). The students reviewed relevant documents, carried out water sampling, studied hydrological regimes (water quality etc), undertook vegetation mapping based on observation and historical photographs, observed frogs, reptiles and mammals and developed a bird list based on one that had been created by a couple living in Stone Street. They also

sampled terrestrial invertebrates (insects, spiders, dragonflies, etc). The storm water pool at the outlet of the Swan Lake Main Drain below the Water Corporation block in Stone Street was also sampled and showed a disappointing lack of aquatic invertebrates and some *Gambusia* fish. The overall aim of the 1991 study was to develop a management plan for the area which was referred to as the 'Garratt Road Wetland'. It is interesting to note that the work of Nicole Siemon and her colleagues was used in several subsequent reports and is still acknowledged in publications on Baigup, e.g. in the current management plan (GHD 2015).

The students carried out 40 face interviews and collected 10 further questionnaires at a later date. Of the 50 surveys, 35 were done in Stone Street along the northern border of Baigup. The remainder were carried out in nearby streets. Residents were asked about their use of fertilisers and other garden and household chemicals, their car-washing habits and the incidence of fire in the reserve. Given that most residents in Stone Street still used septic tanks at the time, the impact of household practices could be expected to have implications for the reserve below their properties. The objectives of the 1991 survey were therefore to:

- i) establish indirect human impact on the wetland system
- ii) associate community perception of the wetland with the intensity of usage
- iii) gain insight into the site history of the wetland, and
- iv) obtain a preliminary reflection of community preferences associated with the development of a management strategy for the area. (Siemon et al. 1991:11)

The second general survey of local residents was carried as part of a Management Report produced in 1994 for the then Department of Planning and Urban Development. (Regeneration Technology 1994). Forty households were visited in Stone Street, Kelvin Street and Queen Street and residents were asked about their perceptions of the cultural significance of Baigup, the value of the reserve for flora and fauna, whether the resident would be "interested in becoming involved with a local community group concerned with the maintenance of the Baigup Wetland Reserve", and their recreational use of the reserve. Residents were also invited to make general suggestions about the future management of the reserve.

The 2017 local residents survey

Purpose and procedure

Although primarily intended to seek fauna-related information from local residents, the 2017 survey, like the previous surveys, also sought general information about length of residence in the area, frequency of visits to Baigup, values in relation to the locality, and concerns residents might wish to share or questions they might like to ask. Copies of the cover letter, survey form, and reminder are attached at Appendix 2.

Survey forms with prepaid envelopes were placed in 102 letterboxes in streets bordering Baigup Wetlands at the end of June. Most were distributed in Stone Street (both sides of the street) with a few additional forms to houses backing on to Baigup in Garratt Road and properties adjacent to or opposite the Baigup entrance at the Swan View Terrace/Kelvin Street corner. Just before the return date of 14 July, a reminder note was distributed extending the return date to 19 July. As two houses were later found to be unoccupied, the number of forms was adjusted to 100 for calculation purposes.

A total of 32 forms (i.e. 32%) were returned. Although BWIG was later told that some residents did not want to participate because they were embarrassed about not knowing the names of birds, the survey nevertheless provided a useful amount of information about local residents' knowledge,

values, and concerns in relation to Baigup Wetlands, particularly as this was a pen and paper survey. An email survey might have resulted in a higher return rate but the email addresses of local residents were not available to BWIG.

Survey participants

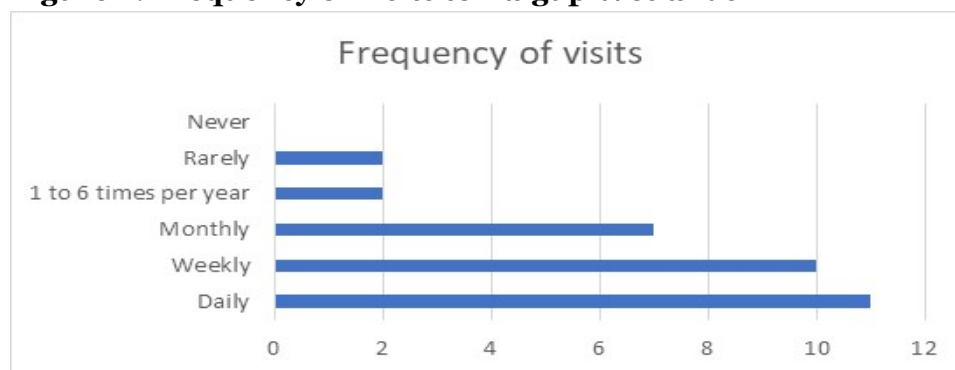
Nearly 70% of participants in the survey had lived in the streets bordering Baigup for 10 to 40 or more years as shown in Figure 1. Length of residence ranged from 4 months to 63 years. Almost half the respondents (14) lived in properties sharing a border with Baigup Wetlands.

Figure 1: Length of residence



Most respondents visited Baigup frequently (Figure 2). Almost 66% visited daily or at least weekly (11 every day and 10 each week). Another 7 estimated that they visited monthly, 2 ticked the 1-6 times a year box, and 2 “rarely”. Sixteen asked to be put on BWIG’s newsletter list and 22 requested a copy of this report. Some people responded anonymously. Of those who gave their names, several indicated that they already received BWIG newsletters and notices.

Figure 2. Frequency of visits to Baigup Wetlands



The information shared by local residents is summarized below along with some discussion as appropriate. Recommendations for follow-up action are included at the end of the report.

Birds seen and heard around local residents’ homes

Thirty one respondents filled in the sections of the form relating to birds. Seventy-seven bird species or categories (e.g. ducks in general) were mentioned in reply to Question 1. Most of the 96 species of birds officially recorded on the BirdLife WA database for Baigup since 2012 were listed by at least one person, with only 22 species not mentioned at all. A few Stone Street residents are keen birders:

7 (nearly 22%) identified between 22 and 30 bird species each. Twelve people (37%) responded to the specific question about whether they had seen or heard owls by affirming that they had.

It seems that the cheeky little Willy Wagtail (noted by 23 people) is the bird most often recognized around Baigup. Other well known birds include: Australian Pelican (22), Australian Magpie (22), ducks in general (22), and Australian White Ibis (sometimes called Sacred Ibis) (19). Other frequently reported birds were: Laughing Kookaburra (17), Australian Raven (also referred to as 'crows') (16), Black Swan (11), New Holland Honeyeater (11), Yellow-billed Spoonbill (10), and Magpie-Lark (also known as Mudlark, Peewee, Peewit or Muddies because of their neat and generally well hidden mud nests high in large trees) (10).

'Doves' were mentioned by 13 people. There are two species in Perth. Both are introduced and previously referred to as 'Turtledoves'. According to Wikipedia, the dainty little blue winged Laughing Dove (previously Senegal Dove) (2) was introduced from sub-Sahara Africa in the late 1890s, while the slightly larger Spotted Dove (1) from eastern Asia was brought first to Melbourne in the 1860s and then to other Australian cities in the decades following. (Birds in Backyards: BirdLife Australia website.) Three respondents also noted Rock Doves, often referred to as pigeons.

Local people are well aware of honeyeaters which often nest in gardens around Baigup. Six residents mentioned honeyeaters in general. In addition to the New Holland Honeyeater, which is dominant in most local streets (11), Red Wattlebird (a large noisy honeyeater) was mentioned 7 times along with White-cheeked Honeyeater (5), Singing Honeyeater (4) and Brown Honeyeater (4).

Whilst ducks (22) were widely recognized in a general sense, a few respondents were also familiar with the names of some species: Pacific Black Duck (4), Australian Shelduck (4), Australian Wood Duck (3), Musk Duck (1), Hardhead (1) Australian Shoveller (1) and Grey Teal (1)

Other water birds included Purple Swamphen ('Pukeko' in New Zealand and now known as 'Australasian Swamphen' in Australia) (9), Eurasian Coot (6), Dusky Moorhen (4), Buff-banded Rail (2), Australasian Grebe (2) and Spotted Crake (1).

Eight people mentioned cormorants. 'Cormorant' is a general term often used in Perth to include the Australasian Darter (mentioned specifically by 2 people), Little Black Cormorant (4) and Great Cormorant (1).

When it came to herons and egrets, the Eastern Great Egret was best known (8) with White-faced Heron (4) and Nankeen Night Heron (1) also mentioned.

Eleven people wrote 'unknown' in regards to the birds whose names they did not know. 'Little brown birds' (known to birders as LBBs) were also noted by 4 residents. Some residents knew the names of a few of these small species: Silvereye (4), Variegated Fairy-wren (3), Grey Fantail (2). White-browed Scrubwren, Western Gerygone, Splendid Fairy-wren, Mistletoebird, Australian Reed Warbler, Striated Pardalote, and Spotted Pardalote all received one mention each.

Carnaby's Black Cockatoo was reported by 8 people and Forest Red-tailed Black Cockatoo by 6. Both species are threatened by the clearing of food trees like Marri and Banksia in the metropolitan area and by the loss of large trees with nesting hollows, often removed or pruned for urban safety reasons.

In the parrot world, Australian Ringneck (6) and the beautiful, but non-local and invasive Rainbow Lorikeet (6) were best known, with Galah (5), corellas in general (3) and Red-capped Parrot (2) also noted.

Raptors in general were noted by three people. Several raptors were also specifically named by a few people: Australian Hobby (3), White-bellied Sea Eagle (2), and Eastern Osprey, Swamp Harrier, Collared Sparrowhawk, Brown Goshawk and Black-shouldered Kite by one person each.

Other birds known to some local residents were Black-faced Cuckoo-shrike (6), Grey Butcherbird (4), Silver Gull/gulls in general (2), Boobook (2), with Welcome Swallow, Sacred Kingfisher, Rainbow Bee-eater, and Pallid Cuckoo each listed once.

Nesting: The Willy Wagtail had been seen nesting in gardens by 8 residents. Eight people also observed doves nesting. Other birds that nest in gardens include New Holland Honeyeater (4), Australian White Ibis (4), Magpie (3), ducks, including a Wood Duck nest specifically mentioned by one person (3), small unknown birds (2), honeyeaters in general (3). Magpie-lark (Mudlark), Laughing Kookaburra, Raven, Buff-banded Rail, Little Brown, Singing, and White-cheeked Honeyeater were all reported once. One respondent used ☹ to indicate disappointment that no birds had been seen nesting in her yard.

When asked whether they thought there had been any changes relating to birds in recent years, 20 people responded. Five said they thought the number of birds had increased while 4 thought they had decreased. Table 1 shows the full range of comments reflecting residents' impressions of the bird situation at Baigup.

Table 1: Comments about birds

Seeing lots of birds (more) than usual needing somewhere to nest.
Not many owls around anymore.
Noticed more ducks around the neighbourhood
More Rainbow Lorikeets
Increase in Honeyeaters, Willy Wagtails and Ravens. Arrival of Rainbow Lorikeets.
The destruction of nests and young of all small birds by Ravens. Very few survived last breeding season.
More red & white tailed cockatoos in the months April and May this year.
Increased birdlife over last few years
Reduced in numbers. Black cockatoos coming in to feed
Decline in Carnabys. 2 years ago we saw flocks of 30, now more like 15.
Not so many Muddies.
Red tail black cockatoos started feeding on White Cedar. When the soil was bare on the main riverbank, Rainbow bee eaters used to nest there (they don't now as the bracken has taken over – but the wrens moved in instead because they like the cover of the bracken)
Less Kites and Willie Wagtails
30 years ago, Hawks over Baigup. Not anymore.
Not seen owls before last 6 months.
Less as more trees being demolished and backyards now non-existent. Roads busier and noisy
Haven't seen as many Kookaburras
Maybe less ducks on [Secondary] lake
The removal of cover typha and other “non native” eucalypts has reduced numbers. Breeding success seems low due to foxes and cats having easier access. Sheoak stands are a wasteland.

Discussion: It is clear that many residents are familiar with the birds they see in their gardens and around Baigup but the names of specific bird species are not particularly well known by many people.

Frogs

Frog information was provided by 26 respondents (81%), 5 of whom were aware of frogs but did not know their names. The best recognised were Quacking Frog (17 mentions) and Motorbike Frog (16). Banjo Frog and Slender Tree Frog were identified 12 times each. The tiny Rattling/Clicking Froglet (9) and Squelching Froglet (8) were also noted. Especially interesting was the fact that 4 local residents had heard Moaning Frogs at Baigup. Males of this species call only for a short period in Autumn after they dig their burrows and wait for a female to respond to their invitations. They are not often seen or heard at other times of the year.

When asked whether they had noticed any changes relating to frogs in recent years, 20 people responded (Table 2). The majority (14) thought that there were fewer frogs: Slender Tree Frog, Motorbike Frog, brown, and Quacking Froglet being specifically mentioned. Only 4 people thought there were more frogs, including Motorbike Frog.

Table 2: Comments about frogs

Where have all the frogs gone? I believe they reside in the maintained wetlands. Yes, there are less! But, I hear them at sunset/evening. The frogs used to come to our garden. They are less of them or my garden is no longer a place for frogs. I am sure it is the former.
Very few Green Tree Frogs in recent years.
Less. We have a pool and have seen a lot less in recent years
Yes, less frogs
More in my garden as garden has grown
Less frogs around
Gradual increase in Motorbike Frogs. Decrease in other frogs in Baigup.
Less brown frogs in my garden and a few more small green frogs.
Not so prevalent last summer but could be due to weather conditions
Less frogs, we used to have a few in our backyard but now we see none.
Have heard more recently
The frog orchestra seems to have dimmed in power i.e. less numbers participating than 3 years ago.
Increasing population.
Not really – some years <u>very</u> loud, other times not so much. Moaning Frog heard in Typha below 51 Stone Street.
Less Frogs
Fewer with recent developments that have encroached on the wetlands (Stone Street)
Less Frogs
Less quacks
Usually have one or two Motorbike frogs in backyard pond. None this year.
Moaning Frog – This year only on foreshore near Kirkham Hill steps. The summertime king tide ingress of salt water to the swamp reduces them where it comes in. The spraying and clearing has removed cover and also reduced them. Incessant spraying of herbicides over water MUST STOP.

Discussion: As different species of frogs tend to dominate in different parts of the reserve, location of people's houses may be one factor in different perceptions. However, a range of valid reasons were put forward for reduced numbers. While the total number of *species* may not have changed in recent decades, BWIG members who regularly visit Baigup also tend to agree that *total numbers* of several species seem to have decreased in the last decade or so. It is to be hoped that numbers will build up again as revegetation expands in the areas where invasive bulrushes have been removed and the fresh water they need to survive is available.

Snakes

Snakes are quite frequently seen around Baigup. Almost 73% (23 people) responded to the questions about snakes. Dugites had been seen by 17, Tiger Snakes by 6 and a Blind Snake by 1 person. Seven respondents had also seen snakes they could not identify. Table 3 provides further information about recency and locations of sightings.

Table 3: Recency and locations of snake sightings.

In Spring, fairly often
6 months ago in the garden. It was 30cms.
There used to be bigger and more frequent snakes slithering across the road and garden.
Approx 12 months ago, outside our back gate that backs on to Baigup
2016
2007 At home
Baigup pathway about 14 months ago
Last summer
Within 6 months
2 months ago
Dugite killed on Stone Street 2 years ago. Tiger snake in yard 30 year ago
Dugite killed in McGann Street 4 years ago (building site)
Baigup Wetlands, Garratt Road end of footpath November 2016
Along the wall
About 3 months ago we had a 3ft snake in our loungeroom.
A few years back we had one in the laundry. Small ones have been sighted in the yard.
Last 6 months back garden
Years- maybe 8 years since I saw a Dugite last.
Last summer next to pathway in Baigup. Baby in backyard.
Last October, or roundabout was one seen at bottom of street near Kelvin Street.
Couple of years ago, around the yard.
2 Last summer in garden
6 months my yard
6 Months South End Stone Street. Clearing/filling has definitely resulted in fewer tiger snakes.

Discussion: Snakes are an essential part of the natural ecological balance of wildlife in a wetland and from that perspective it is good to know that Baigup is healthy. As native species, snakes are protected. From the point of view of local residents, however, snakes can be a real concern when they come into people's yards and houses. Most people quickly turn to the web for information about what do when snakes are found on local properties (e.g. call a snake handler for removal). There are also signs on the sealed path warning about snakes which are especially active in spring and early summer.

Turtles

The turtles that live in Baigup Wetlands have had various colloquial names including 'Oblong Turtle' and 'Long-necked Turtle'. Some of the confusion apparently dates back to a scientific mistake well over 100 years ago. Today the official name for the local turtle is Southwestern Snake-necked Turtle. Eleven residents reported seeing turtles. Five had seen turtles depositing their eggs in shallow hollows they had excavated then filled, 3 had seen baby turtles, and 4 reported seeing dead turtles. Two people thought there were fewer turtles than in the past, both in Baigup and Stone Street. Eggs and baby turtles had been seen in one backyard about 5 years previously, an adult was also in the swamp at the bottom of another property. A turtle seen at one back fence 5 years previously had been returned to the wetlands.

Discussion: Most people living and walking beside the river or on the Maylands Peninsula have never seen a turtle. Many walkers in Baigup may not be aware of their existence, or the fact that they lay

eggs. Nests are regularly destroyed by foxes or dogs in Baigup and around the Maylands Peninsula lakes. For instance, a turtle in the process of laying eggs was photographed in October 2017. By January 2018 that nest had been completely destroyed. While a fox may have been the culprit, it is also possible that domestic dogs, either on or off leash, were responsible, their owners perhaps ignorant of the importance of preserving these nests to maintain the turtle population at Baigup.

Across the metropolitan area, adult turtles and hatchlings are seen every year trying to cross roads, get around fences, or climb out of roadside gutters. The question of how to best help these animals get out of danger is often asked. Turtles may live up to 60 years and many like to move from wetland to wetland along routes they may have travelled for decades. Sometimes the wetlands they seek have been filled in for housing or playing fields or access has been blocked by major highways or suburban roads or fences. Female turtles often travel to find a suitably nesting spot. The best way to help an adult turtle cross a road or get around a barrier is to carry it across to a point where it can proceed safely in the direction it has chosen. Returning it to where it came from is a kind act but in all likelihood the turtle will simply set off again soon after. Baby turtles, having hatched in a dry location, perhaps under a bush in someone's garden, know by instinct to seek out the nearest fresh water swamp. They can be assisted by keeping dogs and cats away while they are on the move.

Native Water Rats, Bandicoots and Possums

As Table 4 shows, 8 residents reported seeing Native Water Rats (also known by an Eastern States Aboriginal name as 'Rakali') and the locations they had seen them in.

Table 4: Water Rat locations

Over near Ascot Waters on bike path 3 years ago
On path running through Baigup 4 years ago
Probably about 6 years ago, swimming in the secondary lake alongside the pathway midmorning
Approximately 20 years ago in river back of Baigup.
In backyard
Baigup 2016 crossing path Western end
Last summer
On the driveway eating fallen fruit.
Near rowing jetty high water February Night [2017?]

Three residents also reported seeing bandicoots in the past and 3 remembered possums. One person wondered if noises in the roof might be possums.

Discussion: It is encouraging to learn of Native Water Rats being seen in recent years near Baigup as they have also been observed both up and downstream. They are elusive animals but an important part of the natural healthy Western Australian wetland food web. Quenda (Southern Brown Bandicoots) and possums lived along the river in the past. Neither has been definitely reported recently in the Baigup area, although Quenda are increasing in some other metropolitan areas and possums are found in some other suburbs.

Foxes, rats, and domestic and feral cats in the wetlands

In response to Question 12, local residents reported seeing foxes (7), rats (15), feral cats (3) and domestic cats (7) in the reserve. One person reported a feral cat killing a duck in a Stone Street property.

Discussion: Although introduced predators like foxes and cats are now part of the ecological systems of places like Baigup, they can have a very serious impact on bird species that nest on the ground.

New cat laws require domestic cats to be microchipped and controlled. It is also understood that COB is planning a fox eradication program across the City. Although foxes in rural areas can be baited with 1080 or shot, neither of these strategies can be used in built up areas. Foxes and cats are also both very wary of cage traps, although these are a relatively humane way to capture them.

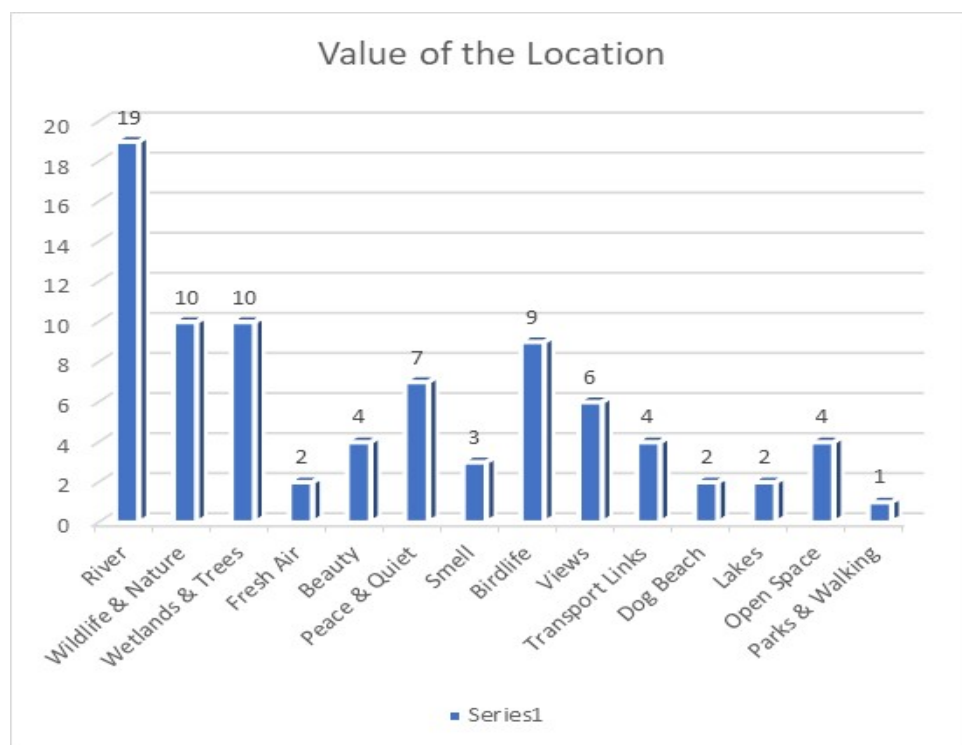
Crustaceans and fish observed in Baigup Wetlands

Crustaceans, possibly gilgies, have been disturbed on several occasions on BWIG weeding days, for instance when hand weeding channels. Only 5 residents reported seeing gilgies or fish in Baigup.

Community values relating to location

Figure 3 displays a summary of topics that featured in residents' responses when asked what they valued most about living where they. Many residents shared a passionate affection for their beautiful location. One person noted: "The wetlands, the wildlife, the fresh air, the beautiful colours, the river, the smell." Another: "Being able to walk through Baigup is a treasure and living here I hear the frogs and can see many trees etc." Many properties offer a feeling of "country style living" with views and "open space". One resident appreciated having "not having back neighbours".

Figure 3: Summary of values in relation to residential location



Not surprisingly, proximity to the river was specifically mentioned by 59% (19) of the respondents. The benefits of living in a peaceful, serene, and tranquil location in close contact with the natural environment in what is increasingly an inner city location were highlighted (e.g. in terms of easy access to public transport) although one person worried that property developments underway in Stone Street were already undermining the tranquility of the area.

Given that the survey primarily focused on birds and animals at Baigup, respect for wildlife and the natural vegetation was perhaps naturally highlighted in many comments. Proximity to a dog exercise area and dog beach in Riverside Gardens upstream of Garratt Road Bridge was also mentioned by

several people. One person said they appreciated information provided in Baigup [via QR codes set on benches and two entry posts].

Protection and preservation of Baigup

All but two respondents made suggestions about how to protect and preserve Baigup into the future. Six also shared additional thoughts and suggestions when asked if they had other comments to make. This section of the report summarizes the concerns and ideas expressed in sections 18 and 19 of the survey form under several general headings.

Education and promotion

Nine local residents addressed questions of education, improved respect and research, and promotion of the status of Baigup Wetlands. It was suggested that more work be done to inform schools, universities and the local community and educate people, including dog owners, about how to help protect and preserve the environment and make them “more aware of wildlife”. A few respondents commended BWIG for efforts to inform the general public [e.g. via Newsletters, Facebook Twitter and local newspapers]. One person urged: “keep the community involved” [e.g. in weeding and planting days, workshops etc.]. Another wanted more surveys, e.g. of plants.

Discussion: It was clear that the Bush Forever status of the whole reserve is not widely known, nor the fact that the Maylands section is already a Crown Reserve set aside for conservation and the fact that Baigup Wetlands is a listed Temperate Coastal Saltmarsh Threatened Ecological Community. Several respondents were already receiving Baigup newsletters at the time of the survey. Another 16 (50%) requested to be put on the email list while 22 (64%) requested a copy of this report. It is clear that an information pack for local residents and schools and for the general public would be a helpful resource. (See further details below.)

Access issues

Nine residents made comments and suggestions relating to access into and around Baigup. At one extreme were comments such as: “Keep our reserve for the birds and waterlife and keep the public out”, “KEEP DOGS OUT”, and “Close bike track. Locals only”. Other comments dealing with access focused on the management of visitors moving around the reserve. For instance “dedicated walk areas” and “designated walking paths” were suggested. One person emphasized that it was important to “keep people away from sensitive areas and fauna”. Another expressed concern about ‘Dogs on Leads’ signs being ignored with consequent risk to wildlife. One person felt unsafe walking alone at Baigup. Another mentioned poor lighting limiting use of the reserve in the evenings.

Discussion: In the context of access issues, it is useful to remember that the Bayswater properties originally extended to the river until they were resumed between the mid 1960s and 1980s, originally for a road reserve (an idea later abandoned), then conservation and public utilities (gas pipeline and deep sewerage). Even where property boundaries were where they are today, older residents have fond memories of their children, or even themselves in a few cases, enjoying free use of the wetlands between their homes and the river.

Times have changed. Today the sealed path through Baigup functions not only as an access track for the pipeline but, more importantly, part of the extensive network of walking and cycling paths around Perth and the Swan River. The alternative to allowing access through the reserve, as seen from time to time when works are required in Baigup, is to redirect pedestrians and cyclists through Stone Street around to the bridge area and back onto the path as it continues upstream through Hinds Reserve and Riverside Gardens.

Baigup Wetlands is well recognized as a high value natural area providing an essential link in the wildlife corridor from the Perth Hills to the ocean. Although there may be some disadvantages in its popularity, Baigup is increasingly recognized (e.g. by BirdLife Western Australia) as a regional rather than a local asset. Local residents' suggestions about how best to manage visitors, including dogs, are helpful and will be passed on to Baigup managers via this report.

Progress has already been made in this regard with a decision by the COB Council in late 2017 to use Cash in Lieu of Public Open Space (CiL) funds provided by Stone Street property developers to construct a walkway and rest area at the west end of the reserve. This will complete the loop trail around the reserve by replacing current ad hoc access between the sealed path and the back of the reserve at the foot of the Kelvin Street hill.

Concerns about property developments

Not surprisingly, several residents were specifically concerned about accelerated residential property development on the Baigup border in recent years. Four people simply wanted the developments stopped. However another pointed out that the area overlooking the river is prime real estate. (It is also, of course, private property zoned residential with multiple dwellings permissible on most lots].

Discussion: We can anticipate that the number of people wishing to enjoy the benefits of living near a natural area like Baigup will continue to rise as residential infill and multiple dwelling developments continue in the streets around Baigup. In addition, as properties on the border have direct access into the wetland, the number of people entering the reserve from the new homes will continue to increase as the more than 40 new residences currently planned, under construction, or recently completed in Stone Street are occupied.

Weeds, native vegetation and restoration issues

Only 6 local residents directly addressed the issue of weeds, while 7 commented on revegetation efforts. There was a general desire to see current weed control efforts continued. One person specifically mentioned Bulrushes and Morning Glory vines. Another respondent argued that, from a wildlife point of view, any kind of vegetation can be habitat for some species and protective cover for many. One person thought that Watercress, Taro, Fig and Arum Lily plants should be retained for human consumption or enjoyment.

Some people were concerned about the amount of habitat in the form of weedy species removed in recent years, including large well grown trees on the WAPC land and the invasive, though native, Bulrush *Typha orientalis* from the Secondary Lake and adjacent areas in the Crown Reserve. Other residents were happy to see the lake cleared, both for aesthetic reasons and to create greater biodiversity through revegetation. One wanted more trees removed along the footpath. Another wanted "encroaching trees from the southern end" to be contained in order to "prevent them changing from a wetland to a woodland habitat". Another person wanted "gentrification of the wetland" to be stopped.

Overall, most residents who addressed vegetation issues supported current restoration efforts. They expressed their approval with comments like: "Reintroduce native flora, remove introduced flora", "Reestablish the bush", and "Continue revegeting with indigenous flora and educate people on its preservation and value to the community".

Discussion: It has to be acknowledged that the original pre-European vegetation along the river can never be fully restored in its original form. The environment in 1829 was actively managed by

Whadjuk Noongar with judicious firing of different plant communities over different intervals of time to create a mosaic of different vegetation complexes to suit the resource needs of the people of those times. Europeans introduced different management strategies when they appropriated the land. Native vegetation was replaced by introduced pasture in areas suitable for dairy farming, market gardening from the late 1800s, and home orchards, etc. in arable sections of Baigup that could be irrigated from the abundant freshwater springs and creeks. Weeds took over during the 20th century as these activities ceased and infrastructure was installed in the floodplain.

Yet Baigup Wetlands today is a nationally listed Temperate Coastal Saltmarsh TEC because of its extensive sedge plain in the more saline areas. It is valued as a Bush Forever site because of its original remnant Paperbark trees (*Melaleuca raphiophylla*) where fresh water is available and Flooded Gum (*Eucalyptus rudis*) communities in the swampy naturally occurring woodland patches at each end of the Baigup. Several other native plant species also persist in the understory of some parts of the reserve.

Current revegetation efforts aim to restore native vegetation to all parts of the reserve, both for public amenity and to provide habitat and refuge for native birds and animals. This restoration activity, in conjunction with current rapid natural regeneration of rushes such as Jointed Twig-rush (*Baumea articulata*) and Lake Club-rush (*Schoenoplectus validus*), as well as the Freshwater Paperbarks, and Flooded Gums, is already providing a varied mix of plant species and habitats in different evolving plant communities with greater biodiversity than previously at the Maylands end in particular.

With respect to the plants specifically mentioned by local residents, there are two species of native bulrush at Baigup. In modern disturbed environments, the Department of Biodiversity, Conservation and Attractions (DBCA) provides permits for the removal of *Typha orientalis* because of its tendency to rapidly take over wetland environments and constitute a fire hazard in residential areas. *Typha domingensis*, a less aggressive bulrush, is also found at Baigup.

There are 4 species of aggressively invasive exotic vines with the potential to quickly smother native vegetation at Baigup. Morning Glory is one of them. BWIG has obtained further SALP funding to remove vines from the woodland next to the river below Kelvin Street. COB and DPLH carried out active vine control programs in their sections during 2017, with every likelihood of these programs continuing until the weeds are under control. Vines are difficult and expensive to remove, requiring many chemical treatments and repeated hand weeding efforts as new seedlings continue to reemerge over years.

Arum Lily is a Declared Pest in Western Australia. As such, all landowners are required, in both rural and metropolitan areas, to “destroy, prevent or eradicate” it as follows:

If a declared pest is found in the area land owners/occupiers and other persons must adhere to requirements under the [Biosecurity and Agriculture Management Act 2007](#) and its subsidiary legislation.

Watercress is destroyed because of its tendency to clog drainage channels and, in doing so, potentially contribute the mosquito problem at Baigup. It is laborious to remove by hand once established, but most of it also dies off during summer. BWIG does not regard Watercress as significant a threat as weeds like Pampas Grass, Blackberry Nightshade, and other annual weeds. It is harvested by several cultural groups (e.g. Vietnamese, Maori) as well as some local residents. It

provides good habitat for frogs and some other aquatic life. Both managers currently have chemical Watercress control programs in place with signs (requested by BWIG) warning in three languages of the danger of eating sprayed food plants. These signs are often ignored.

Many non-local *Eucalyptus camaldulensis* were removed by DPLH on the WAPC land to reduce their spread and also to allow construction of the new fire access track required by bushfire regulations. Two Marri trees dating back to revegetation efforts possibly as long as 30 or more years ago were also unfortunately blown down in a storm. Marri, Banksia, Flooded Gum, and Freshwater Paperbark seedlings have been planted in cleared land to replace these trees and many are thriving although it is acknowledged it will be years or decades before they reach maturity.

Water quality issues

Six residents commented on water quality and water flow issues. There was concern about the “toxic look with rust colour” in some locations and a suggestion to “get rid of stagnant water”. Other contributions included: “Solve ASS” (Acid Sulfate Soils), “prevent salinization” and “monitor quality (salt)”.

The fact that the sealed path functions as an “artificial barrier” or causeway to separate the tidal flats on the riverside from the landward side of the path concerned some residents who wanted it raised or removed to allow natural tidal flows under the path. One resident deplored the straight drains that had been excavated many years ago to take water from the bottom of the properties into the wetland and river. Their potential to carry pollution from properties directly toward the river was also mentioned.

Discussion: The water quality and water flow situation at Baigup Wetlands is technically very complex. There is no doubt that the gas pipeline and its access track (now the dual purpose path) created an artificial barrier that prevents the natural flow of tides in and out of the reserve and the natural outflow of fresh water from the springs along the back of the reserve toward the river. This, together with the two permanent constructed lakes, has changed the character of the area over the last 30 years.

During that time, however, much of the reserve has evolved stable and essentially healthy environments that are different from those in the past. The river has also become more saline than the sea for much of the year, partly due to decreased rainfall over the last 30 years.

Allowing estuarine tides to flow back into predominantly fresh water environments would change their character once again, not necessarily for the better for humans because Summer Saltmarsh Mosquitoes would have more saline tidal pools to breed in closer to the houses. If the Secondary Lake and its channels became more saline, turtles, gilgies, and many bird species would be threatened and much of the native vegetation would die. Salinity along the river shoreline at Baigup and in several locations on the WAPC land has been identified as one of two main causes of Paperbark deaths since the mid 2000s. These deaths would probably escalate.

Management Plans and reports on Baigup since 1991 have repeatedly considered options relating to water flow management. These have included installing additional or different culverts, replacing sections of the sealed path with boardwalks, etc. The lakes were partly designed to improve the water situation. Several expert hydrological investigations between 2005 and 2015 tried to better understand acidity, salinity, and the balance of fresh and saline water throughout the reserve. COB, supported originally by the former Swan River Trust and now by the DBCA, employs a Water Quality

Project Officer to monitor pollution and water quality in storm water drains and water bodies throughout the COB Swan River Catchment area. This includes water monitoring at Baigup as required.

Acid Sulfate Soils (ASS) are common in ancient peaty soils such as those found in Baigup. Heavy metals such as Aluminium, Arsenic, Cadmium, Iron, etc., are naturally found in such soils and can be dangerous if inhaled in dusty conditions (as in mine sites). At Baigup these metals are not the result of recent pollution. They have been there for millions of years. They are safe if left undisturbed and locked up in the peat. The rust red scalds at the east end of the reserve are highly saline and in some patches very acidic (Haasbroek 2016).

Such scalds can give off an offensive sulfur ('rotten egg') smell if allowed to dry out and then get wet again. One solution is to keep them covered with water. In line with this aim, in 2005 8 of the 11 culverts under the sealed path were modified to keep more fresh water on the landward side of the path. BWIG has recently won a grant to enable all culverts to be modified and to improve natural downhill flow of fresh water from west to east. Once completed, these modifications will help DPLH and COB assess whether the 2005 intervention (as originally designed but not fully implemented at that time) can be effective in covering the scalds and lowering water salinity in the east end. During heavy downpours the culverts will continue to allow some flushing from the landward side of the path into the river, as originally planned by ASS experts and COB in the mid 2000s.

Other issues raised by local residents

A range of other issues were mentioned in passing or addressed directly by individuals. These included an allegation of inadequate control of fishers (taking undersized fish), need for more informational signage, concern about litter [perhaps along the shoreline where it is washed in from the river as well as left by fishing people?], demands for better control of foxes and feral cats, disapproval of the six benches set beside the sealed path, excessive use of woodchip mulch 2001-2012, disapproval of the new fire access path in the east end, criticism of the construction of the survey form, and a perception that there were "too many conflicting/overlapping ideas and agencies involved [in Baigup management]". Abusive remarks were also made by one respondent.

Concern about use of chemicals was, perhaps surprisingly, expressed by only one person (3%). There was concern that chemicals are "bad for frogs", that spraying was too frequent, and that weeds can grow back more aggressively if chemical treatment is not appropriately maintained.

Discussion: Many members of Baigup Wetland Interest Group are also concerned about repeated use of herbicides, especially where timely and efficient follow up does not occur and excessive additional amounts of spray are required because the weeds have reached maturity once again. BWIG was pleased to see more efficient herbicide regimes begun in both management sections of Baigup in 2017.

The main chemical used at Baigup is Glyphosate (Roundup Biactive®) which is approved for use in wetlands in Australia. This product does not include surfactants, i.e. chemicals which help spread the herbicide evenly on the plants. Surfactants are known to injure wildlife, especially frogs. The following advice is worth noting however:

To increase the safety factor, the life cycles of frogs in the wetland system need to be known. If possible, avoid spraying during the period from egg lay to dispersal of juvenile frogs into the surrounding area. This period varies according to species, but is generally between late autumn and

early spring each year. Adult mature frogs are far less susceptible to chemicals than the thin-skinned juveniles. Colonisation will occur from nearby areas after treatment, and consideration should be given to leaving some areas unsprayed to allow this to happen easily (WA Museum 1999, Alcoa Frogwatch). Cited in: Water Notes WN22 (2001).

Unfortunately, some species of frogs continue to breed through spring with tadpoles maturing in early summer. This is also the period during which weeds grow fastest, especially in wet environments. Frog species and other aquatic life are persisting at Baigup in spite of intensive herbicide use in recent years. BWIG supports the current managers of the reserve in their resolve to get weed control down to minimum maintenance levels in the next few years. It is hoped that better weed control will see frog *numbers* rise again as revegetation efforts continue. It is good to know that the range of frog *species* seems to be similar to that of the 1990s.

Conclusions

1. A 32% return in a pen and paper survey in the electronic age is a good return. It provides a useful basis for assessing the knowledge and values of local residents.
2. In general, residents in streets bordering Baigup value the natural environment and wildlife found in the nature reserve support current restoration efforts by reserve managers (COB and DPLH) and BWIG and other volunteer groups like CVA.
3. Levels of specific knowledge about animals and birds found at Baigup vary considerably but there is a strong general concern that wildlife and natural vegetation be conserved and protected.
4. Most local residents are not aware of the complexity of hydrological systems at Baigup nor the amount of research done between 1991 and 2015.
5. The history and current conservation status of the reserve are also not well known.

Recommendations

1. An information pack be developed for local residents, schools, and other interested members of the community (see suggested contents Appendix 1). All current residents in streets bordering Baigup to be informed about the pack when it is ready and asked whether they prefer a hard copy or the information in electronic form on a thumb drive. The thumb drive should also be included with other information supplied by COB to new residents in these streets.
2. A public meeting for local residents and other interested members of the public be held to enable Baigup managers and other relevant government representatives to explain the current management situation and the timeline for integration of the WAPC land into the existing Maylands Crown Reserve and conversion of Bush Forever sites to official Nature Reserves.
3. Managers take into account concerns about control of dogs and feral predators, chemical use, habitat destruction, and access and visitor management issues in forward planning of management strategies and schedules.
4. Educational signage be provided in addition to information accessible via QR codes along the TrailsWA virtual trail through Baigup.

References

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Acronyms

ASS	Acid Sulfate Soils
BLWA	Birdlife Western Australia
BWIG	Baigup Wetland Interest Group
CiL	Cash in Lieu (of Public Open Space provided by developers)
COB	City of Bayswater
DBCA	Department of Biodiversity, Conservation, and Attractions
DPLH	Department of Planning, Lands, and Heritage
SNRM	State Natural Resource Management

Appendix 1: Suggested contents for Baigup Wetlands information pack

- * Information about *status, ownership, management and history* of Baigup
- * *Birds*: A3 poster with photos of 30-50 most frequently seen birds at Baigup
- * *Turtles*: information about breeding habits, conservation status, how to help them, etc.
- * *Frogs*: WA Museum leaflets on the six species of frog known to be at Baigup
- * *Snakes*: Information about who to call and what to do in case of snakes in houses or snake bite
- * *Remnant native vegetation*: Information about significant remnant vegetation relevant to the TEC and BF status of Baigup
- * *Control of dogs, foxes and cats in the reserve*: Explanation of the importance of controlling introduced predators, guidelines and regulations
- * *Mosquitoes*: Breeding cycles of Summer Saltmarsh mosquitoes, larvicide use by COB, resident control of other species on properties
- * *Value of weed control on private properties*: Information about DP and WONS weeds importance of controlling spread of Pampas Grass, Madeira Vine, Blackberry, etc.
- * *Fishing, litter, trampling of sedges along shoreline*: Explanation of ecological value of sedges, recreational fishing regulations and guidelines
- * *Management contacts*: COB and DPLH
- * *Community Environment Group contacts*: Baigup Wetland Interest Group contact details and workdays

Appendix 2: Local residents' letter, survey form, and reminder note



PO Box 39
Maylands WA 6931
baigup@iinet.net.au
0448 543 755

28 June, 2017

BAIGUP WETLANDS LOCAL RESIDENTS SURVEY

Dear Resident,

We invite you to participate in the enclosed survey. Your local knowledge and input will be very much appreciated.

The survey has two objectives:

1. To collect information about birds and animals you have seen or heard in or near Baigup Wetlands. This information will be used as part of a fauna study funded by State Natural Resource Management Program. The last survey of this kind was done in 1991 by UWA students.
2. To provide you with an opportunity to comment on, or ask questions about, aspects of Baigup that interest you. Your questions and comments will be shared with the managers of the reserve (City of Bayswater and Department of Planning). We also hope to use your input as the basis for developing an information pack about Baigup for local residents.

Please return your survey form in the enclosed envelope by 14 July, 2017.

If you would like a copy of the survey report, please provide your email address on the form.

Thank you in advance for your interest and participation,

Penny Lee (Coordinator)
Baigup Wetland Interest Group



natural resource
management program



BAIGUP WETLANDS LOCAL RESIDENTS SURVEY

1. ***Birds***

- a) What birds do you see or hear most often regularly around your home?
 - b) Nesting in your garden?
 - c) In or flying over Baigup?
 - d) On the river?
 - e) Have you seen or heard any owls lately? ☐ Yes ☐ No
2. Have you noticed any changes in the birdlife in recent years?

3. ***Frogs***

Have you heard any of the following frog species during the last 12 months?

Please refer to WA Museum <http://museum.wa.gov.au/research/collections/terrestrial-zoology/herpetology-reptiles-and-frogs-collection/frog-calls> *Frogs of the south-west region* section if you are unfamiliar with the different calls.

- | | |
|--|---|
| <input type="checkbox"/> Quacking Frog | <input type="checkbox"/> Rattling or Clicking Froglet |
| <input type="checkbox"/> Squelching Froglet | <input type="checkbox"/> Western Banjo Frog |
| <input type="checkbox"/> Slender Tree Frog | <input type="checkbox"/> Motorbike Frog |
| <input type="checkbox"/> Moaning Frog (heard only in Autumn) If yes, please describe location: | |

4. Have you noticed any changes relating to frogs in recent years?

5. ***Snakes***

- ☐ Tiger Snake ☐ Dugite ☐ Blind Snake ☐ Not sure which

6. How recently and where have you seen a snake or snakes?

7. ***Long Necked Turtles***

- ☐ Adult turtles in your property or in Baigup or your street?
- ☐ Female turtles digging or laying eggs: If yes, where and how recently?
- ☐ Baby turtles (the size of 20c piece): If yes, where and how recently?
- ☐ Dead Turtles: If yes, where and how recently?

8. Have you noticed any changes relating to Turtles in recent years?

9. ***Native Water Rats*** (Larger than regular rats, more facial whiskers, white tipped tail, swims easily with webbed feet, sits up on back legs to eat)

- ☐ Yes ☐ No

10. If yes, please say when and where you last saw a Native Water Rat, even if years ago.

11. ***Marsupials*** (Please say when and where even if years ago.

- ☐ Bandicoots ☐ Possums

12. ***Introduced predators seen in the last 12 months***

- ☐ Foxes ☐ Rats ☐ Feral cats ☐ Domestic cats in reserve

13. ***In the lakes or channels***

- ☐ Gilgies/Marron etc. (please say where if seen in the last 5 years) ☐ Fish

14. How long have you lived in this location?
15. Does your block share a border with Baigup? ☐ Yes ☐ No
16. How often do you go into Baigup Wetlands Reserve?
☐ Daily ☐ Weekly ☐ Monthly ☐ 1-6 times a year ☐ Rarely ☐ Never
17. What do you value most about living where you do?
18. What is the best way to protect and preserve Baigup for wildlife into the future?
19. If you have any questions about Baigup or additional comments please feel free to write on the back page.

Please give your name and email address if you would like to receive:

- a) Results of this survey ☐ Yes ☐ No thanks
- b) Our quarterly newsletters and occasional notices
☐ Yes ☐ No thanks ☐ I'm already on the email list thanks
- c) ☐ If you want complete anonymity on this form please email baigup@iinet.net.au separately to request the report and/or be put on the email list for newsletters.

We appreciate your willingness to share your knowledge and experience.

Please return this form in the prepaid envelope by 14 July, 2017

Thank you.

Baigup Wetland Interest Group Management Team

REMINDER: Baigup Wetlands Local Residents Survey

Dear Resident,

Many thanks to everyone who has returned our survey form to date. Your responses are beginning to give us a useful picture of local knowledge and opinions about Baigup. 102 forms were distributed in streets bordering Baigup. A good return rate will ensure that the survey provides a credible basis for further discussion or action, e.g. applying for more grants for Baigup or taking up issues of concern with City of Bayswater.

Ideally, as many people as possible should complete and return the form, even if some questions are left unanswered. Please feel free to ring or email me if you have mislaid your form or would like help responding to it or if you want to discuss any aspect of the survey. We have extended the return date to Wednesday 19 July to give residents a bit of extra time.

You are also welcome to scan and return the form to us as an email attachment. If you prefer an electronic version of the form, please email me to request a copy.

Kind regards,

Penny Lee

Coordinator
Baigup Wetland Interest Group

0488 543 755
baigup@iinet.net.au