



Croydon - Lake Belmore Crocodile Survey – Freshwater crocodiles (Crocodylus Jonstoni), Saltwater crocodiles (Crocodylus Porosus).

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Foreword: Lake Belmore Crocodile Survey

The purpose of this survey is to give the Croydon Shire Council accurate and honest information on the freshwater crocodile and saltwater crocodile population in Lake Belmore. Lake Belmore is a lake not known for having saltwater crocodiles inhabiting it; however there are rumours that there is a saltwater crocodile that has been possibly introduced into the lake which is not ideal due to the recreational activities conducted in the area. This document will provide an insight into basic crocodile information on both species, documented sightings, a question and answer response and an educated opinion on the saltwater crocodile situation.

I would like to keep all information private with the selected landowners, businesses, farmers or council unless given permission by myself to pass on or advertise.

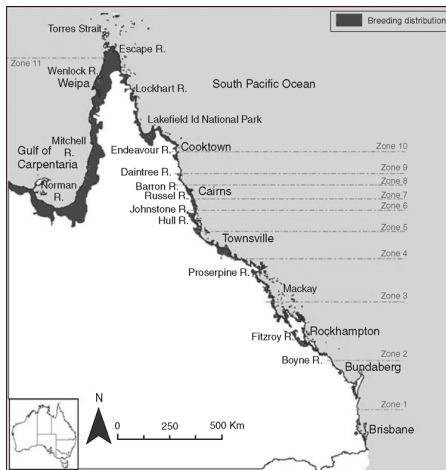
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Introduction: Saltwater Crocodile (*Crocodylus Porosus*)

The Saltwater crocodile (*Crocodylus Porosus*) is described as a semi aquatic ambush predator at the land/ water interface. The earliest fossil evidence of this species dates back 4.0 – 4.5 million years ago, and nowadays are considered to be the most widespread of all 26 Crocodylian species around the globe. They range throughout the top end of Australia through wetlands, billabongs, swamps and estuaries into the Torres Strait islands, PNG, Indonesia and into parts of India.



Saltwater crocodile, sustainable and natural QLD populations including zoning areas.

Currently the Saltwater crocodile is the largest growing out of all 26 species of crocodylian. Average size for female's 2.5 – 3 meters in length, and male's average size 4 – 5 meters and unique individuals will exceed lengths of 6 meters. Saltwater crocodiles will prey on a variety of different animals; smaller individuals will eat fish, bugs, crabs and reptiles. Larger individuals will target pigs, wallabies, cattle, horses and the Asiatic water buffalo. The name saltwater crocodile is actually quite misleading; up to 60% of all saltwater crocodiles are



found in freshwater. They are called saltwater crocodiles because they have the best salt excreting glands out of any of the crocodylians alive today. They are also known as the indo pacific crocodile or the estuarine crocodile.

Introduction: Freshwater Crocodile (Crocodylus Johnstoni)

The freshwater crocodile is also known as the fish eating crocodile, Johnston's crocodile and galloping crocodile. They are the smaller species compared to the saltwater crocodile and are endemic to Australia; fossil records suggest that they have most likely evolved here. Freshwater crocodiles are typically found in inland rivers, creeks and dams but will also co exist with their larger cousins the saltwater crocodiles in fresh, brackish and salt water environments. Freshwater crocodiles also possess salt excreting glands like saltwater crocodiles (Salties) but are typically pushed further inland because the salties will actively hunt and predate on the freshwater crocodiles.

Unlike saltwater crocodiles, freshwater crocodiles (freshies) are typically quite shy and are quick to get out of an adult humans way, a female freshie will average out at 1.5 – 2 meters, the males will average out at 2.5 meters with some individuals reaching 3 meters. Freshwater crocodiles are mainly fish specialists with their narrow jaws that have evolved for catching fish. They will also predate on insects, crustations, turtles, bats, birds, other crocodiles and for the larger individuals small land based prey such as wallabies.



Freshwater crocodile – Cape York

Saltwater crocodiles in Lake Belmore

From historical reports and the location of Lake Belmore it is highly agreed on the saltwater crocodiles are non native to the Lake Belmore region. Freshwater crocodiles have been known to inhabit the lake for many years and are little to no threat to an adult human. If there is a saltwater crocodile inhabiting the lake it is possible that the animal has been introduced by people, pranks, dares or even an old illegal pet crocodile. This survey will investigate this and provide evidence if a saltwater crocodile is found.

If there is a saltwater crocodile inhabiting the lake it is best to remove the animal due to the recreational use of Lake Belmore. The removal method would be conducted by the Department of Environment and Science (DES), as there are strict rules and regulations when interfering or working with crocodilians in the state of Queensland.



Survey – Lake Belmore.

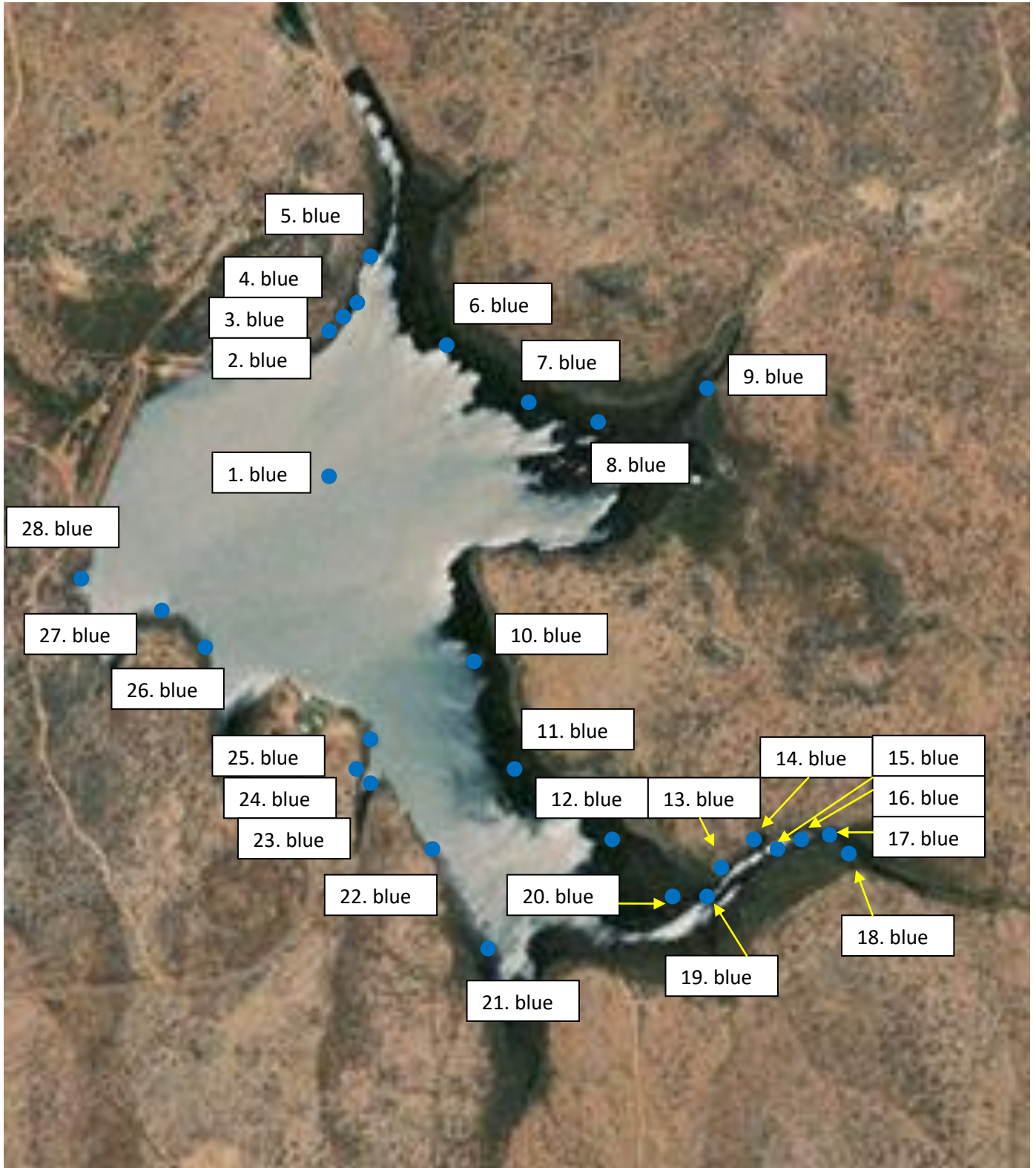
Due to the size of Lake Belmore it was surveyed over the course of three days, the map below indicates the location of individual crocodiles and species. The chart on page 9 shows more information on size, attitude, dates found and any other further information on individuals.


KEY:

- - Red = Saltwater crocodile
- - Blue = Freshwater crocodile

When working with crocodiles it can be quite difficult to study the animal, typically living in swamps, rivers or estuaries. Possessing the ability to associative learning, being primarily nocturnal, some behave shyly while others are quite bold. These are some of the challenges when it comes to surveying crocodiles. Top End Crocodile Service works under strict rules and guidelines when surveying crocodiles, a certain distance is to be maintained and the animal is to be undisturbed/ hands off. These rules and regulations are put in place by the Department of Environment and Science (DES). The chart below is not in chronological order.





Animal Number + species.	Date/ Dates sighted.	Size.	Comments/ Details.
1. blue – freshwater crocodile	25/3/2020	2 meters	Swimming in the middle of lake during the day. Darker coloured individual, rough head.
2. blue – freshwater crocodile	25/3/2020 26/3/2020 27/3/2020	1.2 meters	Quite bold individual, all occasions sighted around same ten meters of bank.
3. blue- freshwater crocodile	25/3/2020 26/3/ 2020 27/3/2020	50cm	One of the smaller animals observed, in good condition, moved about 50 meters along bank over 3 nights.
			
4. blue – freshwater crocodile	25/3/2020 27/3/2020	90cm	Shy individual.
5. blue – freshwater crocodile	25/3/2020 26/3/2020	1.3 meters	Hard animal to indentify, tucked in trees close to shoreline.

6. blue-freshwater crocodile	27/3/2020	1 meter	
7. blue-freshwater crocodile	26/3/2020	2 meters	Could possibly be the same individual as number 1. However head structure looked different.
8. blue – freshwater crocodile	26/3/2020 27/3/2020	1.6 meters	Good look at animal, healthy individual.
9. blue – freshwater crocodile	25/3/2020	70cm	Quick look at animal, quite shy.
10. blue – freshwater crocodile	26/3/2020	1.8 meters	Shy individual.
11. blue – freshwater crocodile	26/3/2020 27/3/2020	2.2 meters	One of the larger crocodiles observed in the lake, good look at animal, good condition. Mature male freshie.
12. blue – freshwater crocodile	25/3/2020 26/3/2020	1.4 meters	

13. blue – freshwater crocodile	27/3/2020	40cm	Most likely a year old.
14. blue – freshwater crocodile	27/3/2020	1.1 meters	Shy individual, lots of good basking banks and croc slides in this area.
15. blue – freshwater crocodile	27/3/2020	50- 60cm	Sighted both during the day and night in same area.
16. blue – freshwater crocodile	27/3/2020	1 meter	Sitting on the bank at night.
17. blue – freshwater crocodile	27/3/2020	60cm	Lots of smaller individuals in this area likely good nesting banks/ nursery for little crocs further up creek.
18. blue – freshwater crocodile	27/3/2020	1 meter	Sitting in shallow pools.
19. blue – freshwater crocodile	27/3/2020	1 meter	
20. blue – freshwater crocodile	27/3/2020	2 meters	

21. blue – freshwater crocodile	26/3/2020 27/3/2020	1.5 meters	Shy individual
22. blue – freshwater crocodile	27/3/2020	1.7 meters	Unique animal has a birth defect on snout in a paddle pop shape, likely high incubation temperatures while in egg development. Appears in good condition.
23. blue – freshwater crocodile	25/3/2020 26/3/2020 27/3/2020	1 meter	Very shy animal, took 3 nights to identify size/ species.
24. blue – freshwater crocodile	25/3/2020 27/2/2020	1.6 meters	
25. blue – freshwater crocodile	25/3/2020 26/3/2020 27/3/2020	2.5 meters	The largest crocodile found in the lake, also called the boat ramp freshie by locals, took 3 nights to identify the individual.
26. blue – freshwater crocodile	26/3/2020 27/3/2020	70cm	
27. blue – freshwater crocodile	26/3/2020 27/3/2020	50cm	

28. blue-freshwater crocodile	27/3/2020	1.2 meters	Basking on the bank, during the afternoon/night.
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Freshwater crocodile in Lake Belmore



Freshwater crocodile slide mark in Lake Belmore

Ariel view over Lake Belmore





Findings

Lake Belmore was surveyed extensively over the course of three days/ nights. The survey methods used include night time spotlighting, day sightings, slide mark recordings and drone flight. The survey was also conducted in a safe and hands off approach for the welfare of the animals and safety of the surveyor that also apply with strict rules and regulations put in place by the Department of Environment and Science (DES). The findings show that 28 freshwater crocodiles (*Crocodylus johnstoni*) were found inhabiting the lake. Beside eyewitness accounts I found no evidence of the presence of a large saltwater crocodile (*Crocodylus porosus*) inhabiting the lake.

Questions and answers response

Is it possible that you missed a crocodile?

The survey conducted was very extensive, any eye shine or crocodile I did not get a positive ID on was investigated further until the animal was identified. It is possible in areas of the lake such as the spillway that there are a few more freshwater crocodiles inhabiting the harder to reach areas. In regards to a saltwater crocodile in the lake I found no practical evidence of one inhabiting the area.

Are the crocodiles breeding in the lake?

The freshwater crocodiles found were mostly adult or sub adult crocodiles with the occasional juvenile a year or two old. I did not find any hatchlings from this season. There is also a limited area of nesting habitat on the lake; typically freshwater crocodiles prefer quiet sandy banks. Lake Belmore mostly contains hard rocky ground not suitable for nesting banks. However in a few pockets in the lake including the day use area there are limited nesting areas for these crocodiles. Most of the eggs in the wild will never hatch out; most drown, overheat or get predated on by pigs, dingos and monitor lizards. The female freshwater crocodiles wont guard their nest in the wild they will hang around the nesting area but anything bigger then themselves they will not attack to defend the nest. If these crocodiles are lucky enough to hatch out most will never make it through the first year of their life, with Lake Belmore being stocked full of barramundi hatchlings would fall victim to these predatory fish, but also birds of prey even other crocodiles would predate on hatchlings.

How could a saltwater crocodile ever get to the lake?

From the survey conducted I found no practical or physical evidence supporting a saltwater crocodile inhabiting the lake. However crocodiles have been known to turn up in areas not known to be natural habitat for them. The main cause of this is human intervention, pranks, dares and old illegal pets get dumped in areas they are not meant to be. Although nothing was found in the lake at this time, with the distance from Croydon to areas such as Normanton which is known saltwater crocodile habitat it is possible that one day this could happen and an animal is introduced into the lake, which leads into the next question.

Is it safe to use the lake for recreational use?

When surveying crocodiles it can be quite a tricky job, crocodiles are quite secretive animals and they move around, as I mentioned earlier there was no practical or physical evidence supporting the reports of a three meter saltwater crocodile in the lake. I will not say that I am 100% convinced there is not a 3 meter saltwater crocodile in the lake. 98% is a better number. If I survey an area and can't find a croc, and then a crocodile is found well that's on me. In response to the previous question, it's not hard for somebody to introduce a saltwater crocodile in the lake, big or small. For this reason I recommend an ongoing approach to this situation. Human safety is the main factor behind this. Using the local rangers/ indigenous community/ council, weekly or monthly hands off surveys of Lake Belmore would give a more accurate monitoring program in the lake. This would be based on identifying potential risks on the size of a crocodile and also identifying the presence of any saltwater crocodiles introduced in the lake.

An example of this is the rangers in Kakadu National Park in the Northern Territory. Many waterholes or waterfalls are cleared by local rangers, which have various strategies in managing crocodiles in these remote areas, making them safe to swim in the dry season for locals and visitors. If this is of interest to council I can offer more information on this in another document.

At this time I believe the lake is fine to use for boating, fishing and kayaking in the main areas. Swimming is obviously the largest risk from a potential bite from a crocodile either if it's a freshwater crocodile or a saltwater crocodile. With the freshwater crocodiles they will most likely move out of peoples way but in breeding season (august- November) the day use area which the freshies will utilise as a nesting bank, will likely have more crocodiles hanging around submerged under the water. Although wild freshies don't guard their nest they will still hang in the area keeping an eye out. There is a potential risk for someone to stand on one in the water, puncture wounds and lacerations would be a worst case freshwater croc bite on an adult human. With young children and dogs I would take more care.



Afterword: Lake Belmore Crocodile Survey

In conclusion the extensive crocodile survey in Lake Belmore from the 25/3/2020 to the 27/3/2020 found 28 freshwater crocodiles inhabiting the lake. There was no practical or physical evidence of a saltwater crocodile inhabiting the lake. Although no saltwater crocodiles were found it is an issue that will remain a thought in the back of people's minds when utilising Lake Belmore for recreational activities. Because of this I believe an ongoing approach to this situation can be introduced into the community of Croydon utilising either local indigenous, council or rangers and setting up a croc watch program where once a week or month there is an overview of the lake making sure there are no saltwater crocodiles present in the area.

I would like to thank the community of Croydon for being very friendly towards me, allowing me to camp at Lake Belmore whilst conducting the survey and a thank you to Denise for giving me the opportunity to spend some time in a beautiful part of Australia. It was a pleasure surveying the lake and would like to hear back on your thoughts of the survey.