

Avian Fauna Survey Of The Cranbrook Salt Lake Systems

Summary Report July-November 2021



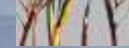
Steve Elson



natural resource
management program



Green
Skills Inc



gondwana link



This survey was independently conducted by Steve Elson. Its results have contributed to the Cranbrook Lakes and Shorebird conservation project supported through the WA' Government's State Natural Resource Management program, Green Skills, the Gillamii Centre, Birdlife Western Australia and Gondwana Link

Introduction

Since July of 2006, extensive and systematic Avian Fauna surveys were carried out within the Salt Lake systems of the Cranbrook Region, these surveys also include areas South of the Stirling Range National Park and within farming areas along the Chillinup Road.

The key objectives of these surveys were to identify important wetland systems that support a high degree of Avian Fauna Assemblages as well as key breeding areas for Rare, Threatened and Endangered Avian species.

During the 2021 survey period a remarkable rainfall event occurred in July with over 134mm impacting on the Extensive Salt Lake systems within the Cranbrook region, this is potentially only the second time since rainfall records began that the lakes have filled to the degree that the water levels have flooded the usually dryland Mallee habitats and associated Vegetation systems.

The Cranbrook Lake systems that usually support a high degree of salinity suddenly exploded with life, detailed Avian surveys of Tom South Lake, Bobs Lake and several of the lake systems along Hamila Road, Salt River Road, and Brickhouse Road were found to support record breaking water levels of brackish to fresh water.

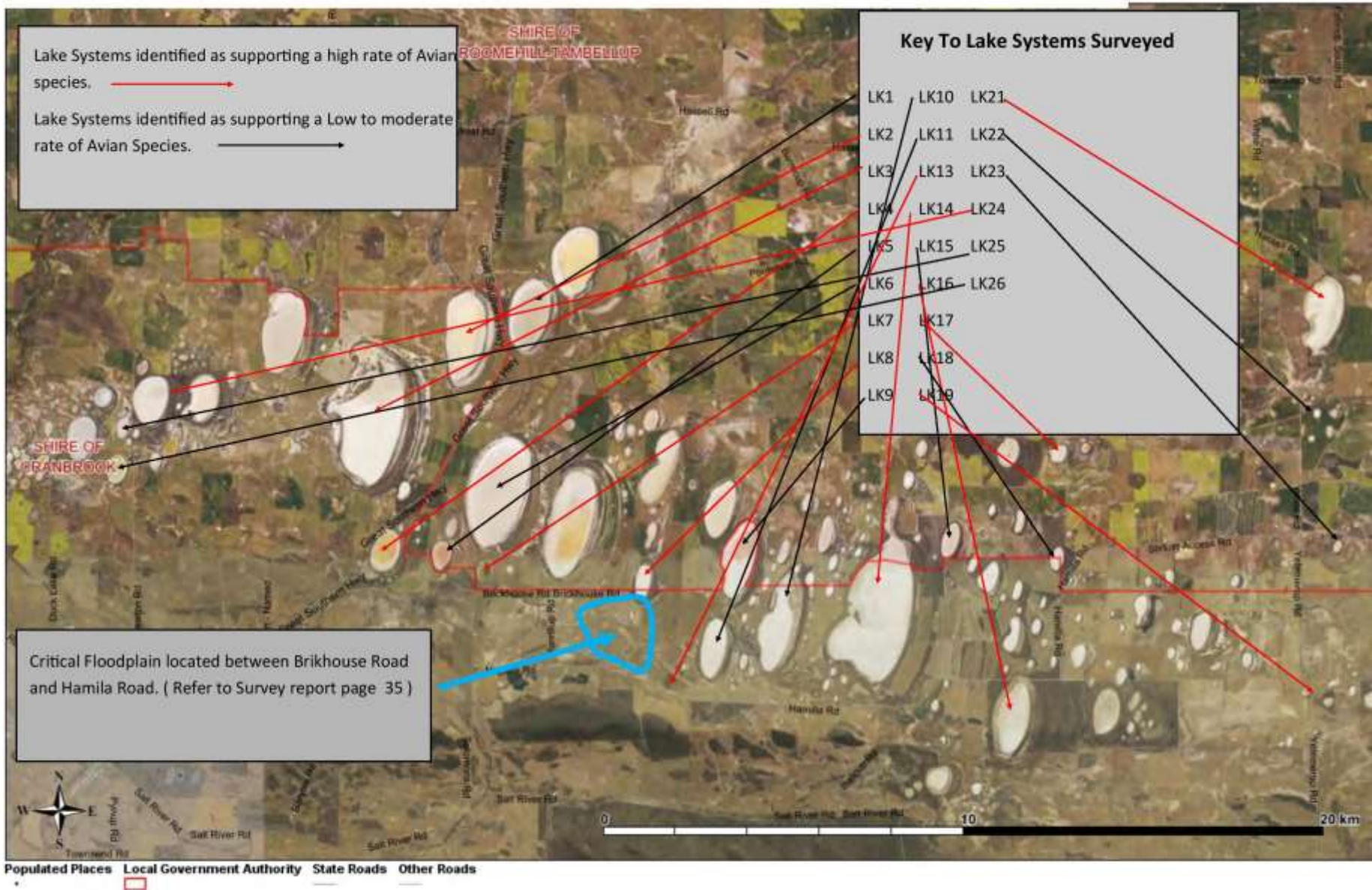
Follow up surveys over the next 4 months (August-November 2021) revealed some incredible breeding events, with many water birds converging on the Cranbrook Lake Systems to breed.

The key methodologies used to evaluate the importance of each lake systems that were surveyed was based on systematic and comprehensive search activities of both the lake system and riparian vegetation zones, these surveys also identified critical feeding and breeding areas for a diverse range of Avian species.

Access to lakes that supported water levels greater than 1m were navigated with the use of small one man canoe, these lakes were extensively surveyed especially within the dense flooded riparian vegetation zones where many active nests were photographed and documented.

Meandering style survey were carried out within those lake systems that supported low water levels of up to 400mm, these lakes often supported flooded Samphire which were found to support numerous nests of Australian Spotted Crake, Spotless Crake, Baillons Crake, Black-Tailed Native Hens and Black-Winged Stilts.

During the survey period all care was given to bird species supporting active nests, Knowledge of the behaviour of individual species allowed for minimum exposure and disturbance, this resulted in gathering important data on the breeding status of the 31 Water bird species recorded breeding within the Cranbrook Salt Lake Systems. **It should be noted that having over 40 years of experience working with a diverse range of bird species, a passive manner approach was employed to gather Data on Birdlife Behaviour.**



Avian Species Of The Cranbrook Salt Lake Systems

In response to above average rainfall between July and November of 2021, large numbers of water birds had converged on the Cranbrook Salt Lake systems to breed, many of the lake systems have filled at record breaking levels with bodies of water now covering usually dry land habitats.

From July to November 2021 a total of 32 on ground surveys were carried out with the key objective of documenting and recording the breeding activities of the Avian species as well as to identify those lake systems that were critical habitats supporting a high rate of Avian species, including Rare, Threatened and Priority species.

Based on the extensive Avian Surveys carried out between July and November 2021, 31 waterbird species were recorded breeding within the Cranbrook Salt Lake Systems which included a total of 820 active nests recorded, this however did not include bush birds found nesting within the Riparian vegetation zones surrounding the lake systems. (A full comprehensive report is currently being prepared , which will include all Avian species recorded utilizing the Cranbrook Salt Lake Systems from July 2006 to December 2021.)

The Water Birds Species Recorded breeding within the Cranbrook Salt Lake Systems from July to November 2021 are as follows:

1. **Little Pied Cormorant *Microcarbo melanoleucos*** - 10 active nests were located within a small wetland **LK17**, all nests were placed amongst two trees *Melaleuca cuneatus*. Close inspection of the nesting colony revealed that the nests supported freshly laid clutches of between 3 and 5 eggs per nest.

Colony was first recorded on Friday 15th of October, follow up surveys were conducted on Saturday 30th of October with no increase in colony size, adult birds were observed sitting tight on nests, both nesting trees were in water 900mm deep and were growing well away from the main Riparian vegetation zones.



2. **Silver Gull** *Chroicocephalus novaehollandiae* - Silver Gull populations increased across most of the lake systems within the Cranbrook Region during the months of July to November with 12 individuals observed on one lake along Brickhouse Road, a total of 32 Silver Gulls were recorded, though not all pairs were breeding, most observations were of birds patrolling the shoreline of lakes searching for newly hatched ducklings.

In total only 8 active Silver Gull nests were recorded mostly between September and October, 4 nests supported 3 eggs, 3 nests supported 2 eggs, and one nest supported 2, one week old chicks, most of the nests were placed amongst dead branches, on islands and in hollow stumps in water greater than 300mm deep.



3. **Whiskered Tern** *Chlidonias hybrid* - Whiskered Terns were observed feeding on the flood plain and adjacent wetlands between Brickhouse Road and Hamila Road, in total 130 birds were recorded of these 48 were juveniles from this years breeding season.

A more detailed survey of the flood plain revealed a major breeding event had occurred between July and August with over 25 old nests identified in close proximity to one another forming a loose colony.

Follow up surveys in October revealed pairs attempting second broods with 4 pairs building floating platforms of grasses within the Northern section of the Floodplain, pairs were also observed placing nesting material on old floating nests of Hoary Headed Grebes.

Observations on the Whiskered Terns Feeding habits identified a number of food resources including Hover Fly spp, Dragon Flies, Tadpoles and various species of macro-invertebrates.



4. **Black-Winged Stilt** *Himantopus leucocephalus*– Black-Winged Stilts were found to nest on those lakes that supported low Samphire especially on islands and Peninsulas surrounded by water.

During the survey period a total of 76 active nests were recorded, one lake supported a small breeding colony of 26 pairs, several nests were placed less than 1.5m apart, most clutches ranged from between 3 and 4 eggs.

The nesting colony also supported active nests of both the Red-Necked Avocet and Red-Kneed Dotterel, all supporting eggs.

Over the Survey period two distinct populations of Black-Winged Stilts were observed, the first group were of Breeding birds with active nests scattered across the Cranbrook lake systems and were nesting in small loose colonies in shallow lakes supporting flooded Samphire, and of several concentrated colonies nesting on islands.

The second population of Black-Winged Stilts were of non breeding birds (mostly adults), these foraging flocks (2000 birds) were feeding within the floodplain North of Hamila Road.

During the survey period from October to the end of November the birds had remained within the flood plain.



5. **Red-Necked Avocet** *Recurvirostra novaehollandiae* - During the Survey period between July and November 2021, a total of 94 active Red-Necked Avocet nests were recorded, of these four distinct colonies were identified, Chillinup Road colony supported 32 pairs, White Road Lake supported 26 pairs, Anderson Lake supported 23 pairs and a lake North of LK 17 supported 13 pairs.

Based on the long term surveys and monitoring of this species, several Key threatening processes impacting on the breeding success rates were identified, these include the predation of colonies from Feral Cats, Foxes and Silver Gulls, as well as flooding of nests during heavy rainfall events.

Observation indicate that Red-Necked Avocets will have up to three nesting attempts, surveys also indicate that those birds that nest singly tend to be more successful as colony nesting often results in a 100% failure rate. Foxes have been observed to destroy entire breeding colonies over a single nights hunting period, especially during the period when foxes are raising their young.



6. **Red-Capped Plover** *Charadrius ruficapillus* - During the survey period between July and November, Red Capped Plover Numbers were very low due to record breaking rains resulting in 90% of the Cranbrook Lakes systems flooding above capacity.

In moderately dry seasons Red Capped Plovers are amongst the most common shorebirds with between 300-400 birds recorded within the Cranbrook lake Systems.

Between the July and November breeding season of 2021 only 10 active nests were recorded with most of the nests located on islands and Peninsula's, unfortunately during follow up surveys most of the nests were lost due to flooding.



7. **Black-Fronted Dotterel** *Elseyornis melanops* - Generally Black Fronted Dotterels prefer fresh water wetlands, during the survey period most pairs were observed nesting on the banks of farm dams and at the edges of fresh water floodway's including the flood plain North of Hamila Road.

8 active nests were recorded between July and November, clutches ranged from between 2-3 eggs. Breeding Success rates were quite low due to increased predation from large roaming flocks of Australian Ravens and Foxes scavenging around the edges of dams, live stock incursions were also an issue as many nests supporting eggs were often trampled on.

During the November surveys 1 pair was monitored for several weeks within the rapidly drying flood plain, fortunately the pair managed to hatch the 3 eggs and raise 3 young to fully fledged stage.



8. **Hooded Plover** *Thinornis cucullatus* - The Hooded Plover population within the Cranbrook Salt Lake systems have declined considerably during the survey period between July and November, one of the key reasons for this is due to extensive flooding of the birds key feeding and breeding areas.

Only 3 active nests were recorded between July and November with all nests being lost due to flooding, nests were located on small exposed sandy islands with little vegetation, clutches ranged from 2-3 eggs.

During the survey period only 8 Hooded Plovers were observed within the Cranbrook Salt Lake Systems including 1 pair at Chillinup Lake Nature Reserve.

Surveys will continue over the summer months as water levels continue to recede thus increase suitable feeding and breeding habitats around the lake systems.



9. **Red-Kneed Dotterel** *Erythrogonys cinctus* - Red- Kneed Dotterels were recorded nesting in loose colonies with Black-winged Stilts and Red-Necked Avocets, a total of 43 active nests were recorded with 30 nests supporting clutches of 4 eggs, 8 nests supporting 3 eggs , 3 nests supporting 2 eggs and 2 nests supporting 5 eggs.

Several Red-Kneed Dotterel nests were located within 440mm of active nests of both the Black-Winged Stilt and Red-Necked Avocet.

Long term monitoring on the breeding habits of all three species indicate that they require secure nesting sites such as Peninsula's and Islands, unfortunately even these sites often fall prey to marauding Foxes and Feral Cats causing catastrophic losses of entire breeding colonies.

Surveys also indicate that those birds that nested on island surrounded by water of depths greater than 1m were more successful as most Feral Cats and Foxes were unable to swim to the islands.

Studies on the breeding Ecology of all three species has shown that some populations located within high predator activity Zones,(more specifically within the Southern Wheatbelt Region) can experience a very low recruitment rate of less than 5%.

During the Survey period, Foxes were observed at all of the Lakes surveyed and were responsible for the loss of 3 significant Red-Necked Avocet breeding colonies.



10. **Banded Lapwing** *Vanellus tricolor* - Banded Plovers were recorded in good numbers across many farmlands surrounding lakes and at the edges of farm dams. During the survey period 10 active nests were recorded with clutches ranging from 3-4 eggs.

Most nests were located in low pastures and recently sowed crops, pairs along Hamila Road nested in small loose colonies with 4 pairs nesting within 40-100 metres of one another.

Breeding pairs were also recorded on farmlands along Salt River Road, Brickhouse Road, Formby Road, Stirling Access Road and White Road.

During the November Surveys, small flocks of Banded Plovers (10-25 birds) were observed gathering on the banks of dams, observations also indicate that some pairs were in company with immature birds from this years breeding season.



11. **Black Swan** *Cygnus aratus* - Between July and November, 46 active Black Swan nests were recorded, of these 14 nests were located within the sub-lakes of Tom South Lake, 8 nests were located within Bobs Lake and nearby smaller lakes and a further 5 nests were located within several small lakes East along Brickhouse Road.

Surveys of the wetlands along duck Road revealed 5 nests whilst 6 nests were located on wetlands along White Road. Many smaller wetlands supported single nests. Most of the 46 nests recorded supported clutches of between 5 and 8 eggs with a few nests supporting fresh incomplete clutches of 3 eggs.

During the November Surveys of Tom South Lake several pairs of Black Swans were recorded with recently hatched cygnets indicating a 100% hatching rate. (based on previous nest counts and clutch sizes).



12. **Musk Duck** *Biziura lobata*– During the survey period only 12 breeding pairs were recorded within the Cranbrook Salt lakes with most pairs preferring to breed on those lakes supporting flooded vegetation , including Paper barks, Samphire and Sedges.

Clutches ranged from 2-3 eggs , nests were placed in low vegetation growing in water > 1m deep. Nests were of large bowl structures of twigs and grasses lined with small amounts of white down.

Successful breeding occurred at Tom South Lake and Bobs Lake with three pairs, each pair raising between 2 and 3 young.

Field observations indicate that the female does most of the incubation whilst the male continues to call and display as well defend the breeding territory from other Waterfowl species.



13. **Blue-Billed Duck** *Oxyura australis* - During the survey period only 2 pairs of Blue-Billed Ducks were observed with one pair at Bobs Lake and the other pair at Tom South Lake, a single incomplete nest was located within tall grasses growing in water, the deep bowl structure was constructed from dry grass material placed in the centre of the tall grass, the nest also supported a small ramp leading to the nest chamber.



14. Australian Wood Duck *Chenonetta jubata*- During the survey period Australian Wood Ducks were mostly observed on farm dams and fresh water lakes rather than salt lakes, larger groups were also observed on farm paddocks and around live stock feeding stations, 90% of nests were located in tree hollows either growing in water or trees growing in paddocks, the key nesting tree was *Eucalyptus occidentalis*, whilst pairs nesting near Cranbrook preferred the large deep hollows of *Eucalyptus wandoo*.

Australian Wood Ducks often lay large clutches with a high incubation success rate with up to 26 ducklings hatched, unfortunately the adult birds and young have to make a journey to nearby water and thus fall prey to a variety of key predators including Australian Ravens, Raptors, Silver Gulls, Foxes, Feral Cats and Monitor Lizards.

Surveys on the Cranbrook Lake Systems indicate a high mortality rate (75%) of ducklings from the time they hatch to about 2 weeks of age.



15. **Australian Shelduck** *Tadorna tadornoides* - Similar to the Australian Wood Duck, the majority of Australian Shelduck nests were located in either large deep hollows of *Eucalyptus occidentalis* or *Eucalyptus wandoo*. Both species also shared similar breeding failure rates of up to 75%.

During the post breeding season the Cranbrook Lake Systems act as an important summer refuge for 1000s of Australian Shelducks, many birds are at their most vulnerable stage as they go through their annual moult.

During the survey period most pairs were observed to breed between June and October with ducklings present between August and October, most pairs were observed with between 5 and 12 ducklings, though these numbers dropped off due to predation of young.



16. **Pink-Eared Duck** *Malacorhynchus membranaceus*- Pink-Eared Ducks were recorded on most of the wetlands that were surveyed, Bobs Lake and Tom South Lake were found to support healthy breeding populations with many nests being recorded within Tree hollows, amongst dense branches of *Melaleuca cuticularis* and on the tops of old White-Browed Babblers nests. When leaving the nest the incubating bird covers the eggs with down.

Follow up surveys also revealed that most pairs that were monitored raised two broods between July and November, duckling success rates at 2 weeks of age were between 3-5 young.



17. Australasian Shoveler *Anus rhynchos*— Australian Shovelers were observed on 50% of the lakes surveyed with active nests recorded at Bobs Lake, Tom South Lake and several smaller lakes along White Road.

During the survey period 12 nests were recorded with most nests located in dense grasses, reed and rushes often at the waters edge or in the centre of tall grasses growing in water, these nests often supported ramps leading to the nest, small amounts of grey-white down were used to line the nests that were often deep bowls constructed of fine grass stems, reeds and rushes, most nests were well camouflaged and concealed, females were observed to do most of the incubation whilst the male would defend the territory from other Shovelers.

Surprisingly the survival rate of ducklings from 1 day-2 weeks of age were quite high with many pairs supporting young, including one pair with 9 ducklings, 2 pairs each with 7 ducklings and 4 pairs each with 6 ducklings.

Of the 12 nests recorded, clutches ranged from 7-14 eggs.

During the Survey period of the lakes within the Cranbrook Region a total of 76 Australian Shovelers were recorded.



18. **Chestnut Teal** *Anus castanea*-- Unlike the Grey Teal, Chestnut Teals are more secretive in their breeding habits with most pairs using smaller sheltered lakes to breed. During the survey period between July and November only 6 active nests were recorded with clutches ranging from 5-8 eggs, 3 nests were located in hollows of dead trees standing in water whilst the other 3 nests were located in tall flooded Samphire.

Follow up surveys to monitor the duckling survival rates were found to be very low with high predation rates from Foxes, Feral Cats, Australian Raven and Silver Gulls.



19. **Grey Teal** *Anas gracilis* - During the survey period a total of 36 active nests were recorded with many pairs nesting in hollows of *Eucalyptus occidentalis* and amongst branches of mature *Melaleuca cuticularis* growing in water as well as on the tops of old White-Browed Babbler nests.

Clutches ranged from 5-26 eggs, duckling survival rates at two weeks of age were as low as 20% due to high predation rates of day old to 1 week old young being predated on by Feral Cats, Foxes, Raptors, Silver Gulls and Australian Ravens.

Grey Teal and Pink-Eared Ducks were among the most prolific of the 30 water bird species surveyed within the Greater Cranbrook Lake Systems, Grey teal were also recorded in large numbers on farm dams along Salt River Road, Hamila Road and Brickhouse Road.

During the November survey period Grey teals were observed to form post breeding flocks with Pink-Eared Ducks, White-Eyed Ducks and Australian Shelducks.



20. **Freckled Duck** *Stricktonetta naevosa* - During the survey period between August and September, 38 adult Freckled Ducks were recorded within one of the Sub-lakes of Tom South Lake, follow up surveys in October revealed that two pairs had move on to the larger Lake (Tom South Lake).

After monitoring the two pairs over the last two months for possible breeding activity, one nest under construction was located amongst the dense branches of a flooded *Melaleuca cuticularis*, the other pair also indicated breeding behaviour with both birds returning to a sheltered part of the lake where the male was observed chasing the female.



Bobs Lake with flooded Paper Barks *Melaleuca cuticularis* were found to be critical nesting sites for Pink-Eared Ducks, Grey Teal, Eurasian Coots and the Rare and elusive Freckled Duck.



21. **Hardhead** *Aythya australis* - White-Eyed Ducks were mostly observed several weeks after the lakes had filled with most birds arriving in small flocks of 10-30 birds, although birds were observed on many of the lakes that were surveyed, only Bobs Lake and Tom South Lake supported active nests with two nests located in flooded grasses within the sub lake of Tom South Lake and a single nest located at Bobs Lake amongst dead branches of *Melaleuca cuticularis* (water depth of 1.2m).

All three nests were well constructed bowls of dry grasses and reeds, one nest was lined with strips of Paper Bark, all nests were well concealed and difficult to locate.

Of the three nests recorded one nest supported 3 eggs whilst the other two nests supported 6 eggs, it was also noted that little down was used to line the 3 nests.

During the November surveys most of the White-Eyed Ducks had reformed into small flocks, joining the post breeding flocks of Grey Teal And Pink-Eared Ducks.



22. **Pacific Black Duck** *Anas superciliosa*- Like The Pink-Eared Duck and Grey Teal, the Pacific Black Duck was common on the larger lake systems such as Bobs Lake and Tom South lake, most nests were located within tree hollows of trees standing in water as well in the forks of trunks of mature *Melaleuca cuneatus* trees.

Clutches ranged from 5-9 eggs, follow up surveys on hatchling survival rates revealed a moderate success rate with individual pairs observed with 3 two week old ducklings, 5 one day old ducklings, 8 one day old ducklings, 6 one week old ducklings, and 2 three-four week old ducklings.

Pacific Black Ducks were the third most common water fowl species and were observed across most of the survey sites.



23. **Hoary-Headed Grebe** *Poliiocephalus poliocephalus*- The Hoary-Headed Grebe was recorded on most of the lakes that were surveyed, surveys also indicate that for nesting, birds preferred lakes that supported flooded Samphire and *Melaleuca* trees and other shrubs that were partly submerged.

Hoary Headed Grebes were found to nest in loose colonies rather than single pairs, as is with the Australasian Grebe.

During the survey period a total of 96 nests were recorded with one colony supporting 36 nests, clutches ranged from 3-8 eggs with most clutches supporting 4-6 eggs, nests were constructed of reeds, grasses, sedges, Samphire and aquatic vegetation, the floating platforms were often anchored amongst flooded Samphire, Melaleuca branches and other partially submerged vegetation.

Breeding success rates were very low, mostly due to high rates of predation from wandering flocks of Australian Ravens, surveys on the breeding colony of Hoary Headed Grebes within the flood plain indicated a complete loss of the colony with 36 nests and eggs destroyed.

The marauding Ravens removed every single egg from the colony, most of the nests were exposed as they were floating mounds anchored to low vegetation within a vast area of open water.

Pairs studied within small lakes supporting dense vegetation were found to be more successful with up to 60% hatchling success rate.



24. **Australasian Grebe** *Tachybaptus novaehollandiae*- Australasian Grebes were mostly observed in small numbers, usually on fresh water wetlands and farm dams.

Pairs were recorded nesting at Tom South Lake, Bobs Lake and several lakes along Duck Road and White Road, active nests were also located on the flood plain and several dams along Hamila Road and Brickhouse Road.

Most nests supported clutches of between 3 and 7 eggs, nests were much smaller than Hoary Headed Grebes nests, Australasian Grebes also preferred to nest as single pairs with no colony nesting observed.

Survival rates of newly hatched young were higher on dams than wetlands, those dams that were more isolated supported minimal completion from other birds and predation activity was much lower, predation from feral animals was very low due to the birds rarely visiting the shoreline, instead preferring to spend most of their time in deeper water.

Nesting pairs that were surveyed using the Floodplain had a high mortality rate of young with several Raptor species present, including both the Spotted Harrier and Swamp Harrier.

Foxes were also observed entering the shallow water of the flood plain.



25. **White-Faced Heron** *Egretta novaehollandiae*- White- Faced Herons were observed on every wetland surveyed , over the survey period 12 active nests were recorded with most pairs nesting in *Melaleuca cuticularis* and *Eucalyptus occidentalis*.

During the November Surveys, observations of post breeding birds indicate a very successful breeding season with flocks of Juveniles of 50-100 birds observed feeding around shallow lakes, feeding observations indicate that they were feeding on large tadpoles, Frogs, Mice and fresh water crustaceans.

Nests that were surveyed were found to support between 3 and 4 eggs and several nests were found to support young at one week of age including 1 nests with 4 young and another nest with 3 young.

Follow up surveys in late October of one nest supporting 3 young had shown that the 3 young leave the nest before they can fly and perch above the nest on branches where they were observed exercising their wings.



26. **White-Necked Heron** *Ardea pacifica*- The White-Necked Heron is a highly nomadic species with most breeding taking place on inland Lakes and along River Systems within the vast Gascoyne and Murchison floodplains. During major rainfall events in the South -West White Necked Herons move onto wetlands to breed.

During the survey period 8 pairs were recorded nesting on lakes within the Cranbrook Region and on lakes along the Chillinup Road.

Most of the nests were located on dead trees in water >1m deep several nests were only 2m above the water level, other nests were located in Yates *Eucalyptus occidentalis* growing in shallow water.

Of the 8 pairs surveyed, 2 nests supported clutches of 3 and 4 eggs whilst 6 nests were still under construction, the nests supporting eggs were poorly constructed of sticks supporting a shallow bowl, female was observed to carry out most of the incubation .

A total of 36 White Necked Herons were observed throughout the Cranbrook Lake Systems, most of these birds were non –breeding birds and were presenting in Non-Breeding plumage.



4. Black-Winged Stilt *Himantopus leucocephalus*– Black-Winged Stilts were found to nest on those lakes that supported low Samphire especially on islands and Peninsulas surrounded by water.

During the survey period a total of 76 active nests were recorded, one lake supported a small breeding colony of 26 pairs, several nests were placed less than 1.5m apart, most clutches ranged from between 3 and 4 eggs.

The nesting colony also supported active nests of both the Red-Necked Avocet and Red-Kneed Dotterel, all supporting eggs.

Over the Survey period two distinct populations of Black-Winged Stilts were observed, the first group were of Breeding birds with active nests scattered across the Cranbrook lake systems and were nesting in small loose colonies in shallow lakes supporting flooded Samphire, and of several concentrated colonies nesting on islands.

The second population of Black-Winged Stilts were of non breeding birds (mostly adults), these foraging flocks (2000 birds) were feeding within the floodplain North of Hamila Road.

During the survey period from October to the end of November the birds had remained within the flood plain.



28. **Australian Spotted Crake** *Porzana fluminea*– During the Survey period 40 active nests were located with most of the nests recorded in Flooded Samphire, several nests were also located in native grasses with nests being placed in the centre of the grass tussock.

All nests were constructed of fine grass stems, some bowls were shallow whilst others were deep, those nests located in Samphire were placed in Samphire clumps that were growing in Water 200mm-1m deep, of **Note**– no nests were located in Samphire that was less than 200mm in height and that observations indicated that the birds required healthy stands of Samphire for nesting.

Those lakes that supported degraded Samphire zones especially around the edges of lakes were not supportive of Australian Spotted Crake populations.

Live stock incursions on lake systems supporting Samphire also degraded the vegetation resulting in reduced breeding habitat for Australian Spotted Crakes, Baillons Crakes and Spotless Crakes.

Of the 49 Australian Spotted Crake nests recorded 15 supported 6 eggs, 6 nests supported 5 eggs, 7 nests supported 4 eggs, 2 nests supported 3 eggs and 6 nests were under construction. During the survey period another 4 nests were submerged under water and had been abandoned due to flooding.

Colony nesting was observed at Tom South Lake and several small wetlands along White Road, many nests were from 20-50m apart from one another.



29. **Spotless Crake** *Porzana tabuensis*– Spotless Crakes were observed on most of the lakes supporting low dense Riparian vegetation including tall dense patches of Samphire, birds were often seen feeding with Australian Spotted Crakes and Black-Tailed Native Hens.

Only 2 nests were recorded during the survey period, both nests were located in Samphire on Tom South Lake, nests were similar to that of the Australian Spotted Crake though slightly smaller in diameter.

Spotless Crakes were also observed at Bobs Lake though no breeding was recorded due to the birds preferred nesting sites being flooded.



30. **Eurasian Coot** *Fulica atra*– During the survey period, Eurasian Coots were recorded nesting on most of the lake systems that supported partially flooded vegetation and lakes that were >1m deep. Eurasian Coots were the most prolific of the 31 waterbird species surveyed within the Cranbrook Lake Systems. A total of 167 active nests were recorded with most of the nests recorded at Tom South Lake, Bobs Lake, several lakes along Hamila road, lakes along White Road, Anderson Lake and several lakes along Duck road.

Most of the nests supported clutches ranging from 3-14 eggs, loose colony nesting recorded on most of the lakes where the Coots were observed to breed, The untidy nests were often constructed of dead Samphire, sticks, reeds and rushes. The inner section of the nest supporting the eggs were often much neater, lined with finer grasses, reed stems, paper bark and other soft plant material, often collected several hundred metres away on nearby paddocks.



31. **Black-Tailed Native-Hen** *Tribonyx ventralis*- Black-Tailed Native Hen Incursions occurred across most of the Cranbrook Lake Systems with breeding occurring on more than 50% of the wetlands surveyed.

Of the 26 Black-Tailed Native Hen nests recorded, 20 nests supported eggs with clutches ranging from 4-6 eggs , 2 nests supported day old chicks and 4 nests were still under construction.

Black-Tailed Native Hens preferred those lakes that supported shallow feeding areas with dense riparian vegetation zones surrounding the lakes, birds also required protected nesting areas especially partially submerged vegetation including dense stands of shrubs growing in water.

Of the 26 nests recorded , 2 nests were placed 2m above the surface of the water, 5 nests were 1m above the water and 19 nests were placed less than 1m above the water, all nests were located in vegetation over various water depths.

Loose colony nesting observed at two lakes with nests as little as 30m apart, 5 nests in a small lake along White Road were located within a 100msq Quadrat .

All nests were constructed of various fine grasses, Reeds and rushes with some nests lined with the paper bark from *Melaleuca a cuticularis*, nests were generally deep compact bowls and much smaller and neater than Eurasian Coot nests.

Nesting was first recorded within weeks of the lakes filling with nest building occurring as early as late July early August, peak breeding with most nests supporting eggs occurring in late September to early October.



Cranbrook's Flood Plain Country

During the survey period from July to November, early winter rains had created a flood plain North of Hamila Road, the large body of water resulted from Julys record breaking rainfall. On ground surveys over the following months revealed that this rare event provided an important fresh water wetland system for a divers range of water bird species, site surveys revealed that the area was identified as a critical breeding and feeding area for a large colony of Whiskered Terns, Black- Winged Stilts, Hoary Headed Grebes, Black Swans and several water fowl species.

Water levels ranged from 450mm to 1m at its deepest point, the size of this fresh water lake from Hamila Road to the North of Brickhouse Road was approximately 2000m in length and at its widest point was approximately 1500m.

Surveys conducted during November indicated a high evaporation rate with the wetland system now reduced to less than one third of its original size, most of the deep water dependant bird species had moved on to more suitable wetlands.

The shallow muddy wetland now forms a critical feeding area for a variety of Shorebird species including large numbers of White-Faced Herons, Black-winged Stilts, Banded Stilts, Red-Capped Plovers, Sharp-tailed Sandpipers, Long-Toed Stints and Curlew Sandpipers.



Bobs Lake

Similar to Tom South Lake, Bobs Lake filled to beyond capacity with areas flooded for the first time in many years. The Avian species were very similar to that of Tom South Lake though breeding populations were higher at Tom South Lake due to increased breeding and feeding habitats across a wider area .

Bobs Lake was found to support Healthy breeding populations of Eurasian Coot, Pink Eared Duck Grey Teal , Musk Duck, Black Swans and Black Tailed Native Hens.

Due to Extensive Flooding over the winter period there were no suitable feeding or breeding areas for Shorebird species other than White-Faced Herons and increasing populations of Pacific Herons.

As the water levels drop over the summer months the islands and sandy edges of the lake will become more exposed, thus providing suitable feeding, loafing and Breeding areas for a wide range of Australian Waders, including, Red-Necked Avocets, Black-Winged Stilts, Banded Stilts, Red Capped Plovers, Hooded Plovers and Red-Kneed Dotterels.

Importantly these lakes including both Bobs Lake and Tom South Lake will provide critical feeding and resting zones for a significant population of Migratory Waders, especially as a stop over point before they migrate back to the Northern Hemisphere to breed.

Based on the November Surveys, Migratory Waders have already started to appear on several lakes where water levels have dropped off considerably including the flood plain lake. Located North of Hamila Road

Species recorded during the November survey period include, Curlew Sandpipers (25), Long-Toed Stints (4), Common Greenshank (9), Sharp-Tailed Sandpiper(76).



Tom South Lake

During the survey period, Tom South Lake and the smaller sub-lakes were found to support significant breeding populations of Waterbirds including Black Swans, Pink Eared Duck, Grey Teal, Australasian Shoveler, Black-Tailed Native Hen, Australian Spotted Crake, Eurasian Coot, Hoary Headed Grebe, Pacific Black Duck, Musk Duck and White Eyed Duck.

The water levels at Tom South Lake are the highest they've been for over 20 years resulting in extensive flooding of nearby dryland habitats.

During the meandering search activities of the flooded Samphire over 40 Australian Spotted Crake nests were located, many of the nests were under construction or had been abandoned due to nests being flooded. (NOTE: these nests were not included in the active nest counts).



Potential Threatening Processes Impacting On The Biodiversity Of The Cranbrook Lake Systems

Based on the long term monitoring of the Cranbrook Lakes Systems and more recently a major field study on the Water Bird Populations in response to the 2021 record breaking rains (July-November 2021), a number of Threatening processes were identified these include:

- 1) Live Stock incursions on lake systems supporting active breeding colonies of Red-Necked Avocets, Black-Winged Stilts, Red-Kneed Dotterel's, Hoary-Headed Grebes, Australian Spotted Crakes, Spotless Crakes, Baillons Crakes, and various waterfowl species including Black Swans.
- 2) Increased presence of both native and non native predator species including Feral Cats, Foxes, Silver Gulls, Australian Ravens, Raptor Species and various reptile species including Heath Monitors, Dugites and Tiger Snakes.
- 3) Nutrifcation of some wetland systems supporting high volumes of animal waste impacting on water quality/ temperature and potential disruption of critical food resources for Avian species including , Brine Shrimp, Aquatic Invertebrates and Terrestrial Invertebrates.
- 4) Clearing of Riparian Vegetation Zones
- 5) Inappropriate fire regimes
- 6) Invasive weed incursions within Riparian Vegetation Zones of Critically important Wetland Systems
- 7) Modification to waterways, creeks and Wetlands impacting on the natural flow and direction of waterbodies
- 8) Extreme weather events impacting on the breeding cycles of Waterbirds and Shorebirds i.e. increased flooding of nests reducing the ability for some species to successfully recruit new populations.

Australian Raven *Corvus coronoides*

Nest and Egg Predation within the Cranbrook Lake Systems

Based on long term surveys and monitoring of Australian Ravens within the Cranbrook Lake Systems, survey results indicate a high predation rate of water bird species especially the eggs and young of Pink Eared Ducks, Grey Teal, Chestnut Teal, Australian Shelduck and Australasian Shoveler.

Other species predated on include the nest and eggs of Black-Winged Stilts, Red Necked Avocets, Red-kneed Dotterels, Red Capped Plover and Hooded Plover.

Surveys also indicate that most of the Lakes that were surveyed support between 2 and 10 active breeding pairs of Australian Ravens.

Since the surveys began in July 2006, Field studies have shown that there are 2 distinct groups of Australian Ravens within the Greater Cranbrook Region, the first group are non breeding flocks of Australian Ravens that feed and scavenge mostly within the Agricultural lands, these flocks support both Juveniles and non breeding adults.

These roaming flocks can be very destructive when they enter wetland systems supporting breeding colonies of both Waterfowl and Shorebirds.



Conclusion And Recommendations

During the survey period between July and November 2021, a total of 32 on Ground Surveys were conducted, it was also found that during a record breaking rainfall event in July and Follow up rains over the preceding months, large numbers of water bird species converged on to the extensive Salt Lake Systems to breed. Based on a systematic and comprehensive assessment of the Cranbrook Salt Lake Systems, the survey results indicate that:

1. 31 Water Bird species were recorded breeding with 820 active nests documented, surveys were conducted within 25 key lake systems including many other smaller lakes that were less than 1 hectare in size. 12 of the 25 lakes surveyed were identified as critically important for a diverse range of Waterbird and bush bird species. Several lakes were also identified as important breeding grounds for Red-Necked Avocets, Black-Winged Stilts and Red-Kneed Dotterels. Two of the larger lakes, Tom South Lake and Bobs Lake were found to support significant breeding populations of Waterfowl species, including Grey Teal, Pink Eared Duck, Chestnut Teal, Australasian Shoveler, Pacific Black Duck , White Eyed Duck, Musk Duck and Black Swan

Tom South Lake was also found to support 38 Freckled Duck where the birds remained for 3 months, two pairs were identified as breeding within the flooded Melaleuca trees of the sub-lakes South of Tom South Lake.

2. The Cranbrook Lake systems (When Dry) support significant feeding and breeding habitats for the Endangered Western race of the Hooded Plover (P4). These lakes when full however" were found to support minimal suitable feeding and breeding habitat for hooded Plovers. During the survey period only 8 Hooded Plovers were recorded including 3 active nests.

3. Lake Systems that supported healthy and diverse range of Vegetation Communities including Riparian Vegetation Zones and dryland Vegetation communities were found to support significant Avian Fauna Assemblages, it should be **Noted** that these lakes were often small insignificant lakes that were found to support a rich and divers range of Waterbird and bush bird species.

4. Based on the long term monitoring of the Avian Fauna and their utilization of the extensive Salt Lake Systems within the Cranbrook Region, it is critical that an integrated approach to feral animal control is put place as both Foxes and Feral Cats were found to have had a major impact on breeding populations of Waterbirds and Shorebirds. During the survey period between July and November several breeding colonies of Red-Necked Avocets, Black-winged Stilts and Red-Kneed Dotterels were completely destroyed.

5. Those Lakes that were fenced off from livestock incursions were found to support reduced Fox numbers around the lakes compared to those lakes where livestock were observed to roam freely, especially within flooded Samphire patches supporting active Shorebird breeding colonies which were decimated as a result of nests being trampled or Foxes predated on the eggs, young and even adult birds.

6. continued surveys of the Cranbrook Salt Lake systems will increase our knowledge on how best to manage these incredibly unique wetland systems.

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