# Bringing back the Swans to the City of Perth 2011

A Swan on the shoreline of Perth Water (May 2011), with the site of the Perth Waterfront development in the background (Photo: S. Lake)

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Funded by City of Perth environment grant for a review of the 2000 Study,
'Bringing back the Swans: the potential to encourage more black swans onto the Swan River'

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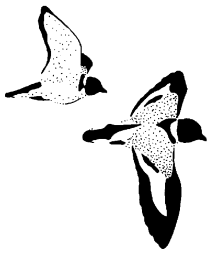

22nd July 2011

## INTRODUCTION

The Black Swan *Cygnus atratus* is confined to Australia (introduced to New Zealand and some other parts of the world), being most abundant in the south of the continent. It features in aboriginal folklore and was an important part of the diet in some regions, and was first encountered by Europeans in 1635. Some 40 years later, Willem Vlamingh explored the lower west coast of what is now Western Australia, and met with Black Swans on what was subsequently named the Swan River. He also took two live swans back to Europe, where they caused considerable excitement as all swan species previously known at the time were entirely white.

While an abundant species and not restricted to the South-West region or to Western Australia, the Black Swan has become both an unofficial and official emblem of Western Australia. It remains common on wetlands around Perth, the city that has grown up around the Swan River, but on the river itself the species has declined due to development of shoreline environments. In response to this, a study was conducted in 2000 (Tingay *et al.* 2000) to investigate the needs of the Black Swan and ways in which its numbers could be increased on the river. This identified the environmental features upon which the species relies, especially in a brackish environment such as on the estuary of the Swan River, and also recognised several locations along the river that might be suitable for development as swan habitat sites.

There were no subsequent developments specifically in response to the 2000 report, but serendipitously there have been several recent projects that have benefitted the birds on the river.

- On Sir James Mitchell Park, in the city of South Perth, freshwater wetlands were created in the late 1990s and these have attracted a small number of Black Swans and at least one pair breeds regularly.
- In the City of Melville, the installation of a low fence to exclude dogs from Alfred Cove Nature Reserve resulted in an increase in a number of waterbird species, including Black Swans. The fence was completed in 2004 and in late summer the swans can now number over 100. Previously, counts of swans were around 10 and the birds were present only intermittently. As a result, swans seem to spread from Alfred Cove as far as Point Walter, across to Freshwater Bay, Milyu, Crawley and even the western end of Perth Water.
- In the City of South Perth, a residential development near Clontarf on the Canning River, Cygnia Cove, has installed a freshwater wetland adjacent to a part of the river where small numbers of Black Swans were regularly seen. Earthworks were completed in early 2011 and the first swan was seen on the wetland in April 2011.

These developments are contributing to an increase in the numbers of Black Swans on the Swan River because they contain the sorts of environmental features that encourage the birds. There are more proposed foreshore developments that may do the same, and as a result The City of Perth awarded Claise Brook Catchment Group an environment grant to conduct a review of the 2000 Study, 'Bringing back the Swans: the potential to encourage more Black Swans onto the Swan River". A major aim of this exercise is to review current proposed foreshore developments within the Perth CBD, to examine ways in which recommendations could be made to integrate

features into these developments that would encourage swans. This report presents the result of this review.

## REVIEW OF THE 2000 REPORT

The 2000 report (Tingay *et al.* 2000) was a feasibility study intended to identify locations on the Swan River where it might be possible to encourage Black Swans to forage, roost and even breed, and to identify the sorts of environmental parameters that would be needed to effect this. The report noted many benefits to attracting swans to the river, such as:

- validation of the use of the Black Swan as a symbol of the City of Perth and of Western Australia;
- promotion of environmental awareness through the iconic presence of the Black Swan;
- environmental benefits to the Swan River and its other fauna; and
- a tourism drawcard with an emphasis on the City of Perth as unique.

A review of Black Swan records carried out for the 2000 report found that swan numbers declined through the 1930s to the 1960s as a result of foreshore development (Serventy 1938, 1948, Tarburton 1972), but that small numbers were consistently observed in a number of areas through the 1990s. While birds were sometimes observed on the river, most of these records were associated with adjacent wetlands, particularly upstream of Heirisson Island, with Swans regularly observed on adjacent wetlands at Burswood, and in Belmont, Maylands and Ashfield. The only consistent observations of numbers of birds on the river were at Waterford on the Canning River, with a dozen birds seen regularly but occasional aggregations of 80 birds, and 8 to 11 birds in the Lucky Bay/Alfred Cove area of the lower Swan River. Sightings were usually reported in autumn, when many freshwater wetlands are dry and the river may act as a drought refuge. The small numbers at Alfred Cove were reported by members of Birds Australia to be a consistent feature of the site at least since the late 1970s.

Tingay *et al.* (2000) identified the following environmental features as being needed for a site to be utilised by Black Swans:

- Open water sufficiently large for the birds to loaf undisturbed, and giving them sufficient distance for take-off and landing. Swans take-off from the water's surface and require about 50m to become airborne. The open water also needs at least some shelter from prevailing winds.
- The water needs to be shallow (<1m) if the birds are foraging on submerged aquatic plants. Depth is less important if they are feeding on the land.
- Salinity of water is unimportant but the birds do need access to fresh drinking water at least once a day. This is a major factor for Black Swans on the Swan River. The birds at Alfred Cove/Lucky Bay and at Waterford have access to freshwater drains.
- Food. At Alfred Cove/Lucky Bay, the swans feed mainly on the seagrass Sea Wrack *Halophila ovalis*. It is not certain what they feed on at Waterford, but there are several freshwater wetlands nearby and swans feed on a very wide range of freshwater aquatic plants. They also feed on lawn grasses such as couch and Kikuyu at wetlands such as Herdsman and Monger Lakes.

- Access to a secure terrestrial roosting site along the shore or on an island. This needs to have a slope that the birds can negotiate (probably a slope of >1:10), needs to be more or less free from disturbance (people and particularly dogs), and the birds need to have good visibility from where they roost so they feel they can detect approaching predators. The rapid increase in Black Swans at Alfred Cove/Lucky Bay seems to have come about solely because of the reduced access to the shore by dogs and people. At this site the birds roost on a sandbar but drink at a drain on the shore. Roosting sites on islands are ideal but not essential.
- Flight paths around d the site need to be free of overhead powerlines and similar infrastructure as Black Swans are prone to birdstrike,

The above features will attract Black Swans to utilise a site. For example, Alfred Cove/Lucky Bay has extensive shallows that provide food (Sea Wrack), a fresh stormwater drain for drinking water, secure roosting areas from which people and dogs are more or less excluded, and it is a large area with good access. A recent (about 2006) increase in swans at Milyu is almost certainly due to "overflow" from Alfred Cove/Lucky Bay, as the supply of freshwater at Milyu is uncertain and disturbance more regular, but there is food and the secure site of Alfred Cove/Lucky Bay nearby.

Requirements for breeding are more complicated and breeding along the river is currently confined to adjacent wetlands. Breeding requirements (additional or variations to the above) include:

- Water depth of about 0.3 to 1m (swans build a large nest that is anchored to vegetation and may sit on the lake floor but protrudes above the water's surface).
- Water level that rises gradually in late winter/spring and does not fluctuate in the short term (thus tidal environments are not suitable).
- Large supplies of nesting material (generally robust aquatic vegetation).
- Protection from disturbance, such as a distance of at least several metres from the shoreline.
- Abundant foraging habitat for the cygnets. This can mean abundant accessible aquatic vegetation but cygnets will also graze on lawns.
- Shoreline with gentle slope to allow cygnets ready access.
- Very secure roosting areas for the protections of cygnets.
- Ready access to freshwater as cygnets need to drink regularly and can't travel long distances to drink (unlike adults).

In general, sites on the Swan River cannot meet the breeding requirements of the Black Swan because of tidal movements, although breeding does occur on adjacent wetlands. To attract Black Swans onto the Swan River, however, the key features required can be summarised as:

- Area of shallow water with at least some shelter from prevailing winds.
- Food in the form of submerged aquatic plants, soft riparian plants and/or lawn grasses. Grasses such as Kikuyu are particularly suitable as they are palatable, grow in damp soil and grow quickly, thus being tolerant of grazing.
- Protected and accessible shoreline where birds can forage and roost with minimal disturbance; roost sites must also provide good visibility for the birds. Island roost sites are ideal.

- Source of freshwater.
- Adequate clearance for flight-paths.

Areas of shallow water and clear flight-paths are not limited on the river, therefore food, protected and accessible shores (or islands) for roosting and freshwater are the factors most likely to determine the potential for swans to utilise a site.

## PROPOSED FORESHORE DEVELOPMENTS IN THE CITY OF PERTH

The relationship of people of Perth with the Swan River has varied over the decades. As recently as the 1950s and 1960s there were rubbish tips on the foreshore at several locations, while Mounts Bay and the South Perth shoreline facing Melville Water were seen as the inevitable location for the Freeway (see Figures 1 and 2). Large areas of shoreline of the lower river have been stabilised with concrete retaining walls. However, the river is also seen as a major resource for recreation. In effect, there was an ongoing period of habitat loss as shorelines and shallows were filled-in and replaced with retaining walls and "tidy" shorelines, ending in the late 1960s. This had a massive effect on the waterbirds of the river, but more recently the primary impact of people on waterbirds has been through increasing levels of disturbance associated with recreation (Bamford *et al.* 2003). There is also growing concern that gradual sea level rise through the late 20$^{th}$ and early 21$^{st}$ Centuries is leading to a loss of mudflats and shallows upon which migratory shorebirds in particular are reliant. The Red-necked Stint *Calidris ruficollis*, for example, the smallest of the migratory shorebirds in the region and the most dependent upon mudflats, has now virtually disappeared, whereas it occurred in numbers of up to several thousand as recently as the early 2000s (M. Bamford, unpubl. data).

Against this background of habitat loss and increasing disturbance, there has been a growing recognition that the river and its wildlife are part of what makes Perth as a city. Connectivity between community and river has been encouraged at sites such as Burswood, Heirisson Island, Sir James Mitchell Park and Waterford. This recognition of the link between the city and its river and wildlife also underlay the 2000 report on Swans, and of course lies behind the current project to review that report and provide advice on how catering for swans can be included in currently proposed foreshore developments in the City of Perth.

There are several major development proposals and some existing sites on the river foreshore in the City of Perth where there is the potential to encourage Black Swans. These are:

- Perth Waterfront development (William to Barrack Streets and adjacent areas).
- Point Fraser.
- Heirisson Island.
- Mounts Bay/interchange lakes.
- East Perth Riverside development, in particular the Waterbank Precinct.
- Claisebrook Cove.

Each of these can be examined with respect to the key features likely to attract swans to a site on the river:

- Area of shallow water with at least some shelter.
- Food (submerged aquatic plants and/or lawn grasses).
- Suitable shoreline for roosting.
- Source of fresh water.
- Suitable flight-paths.

Perth Waterfront development (William to Barrack Streets and adjacent areas).

This is a major project, focussed mainly on cultural developments, but existing plans do allow for the provision of habitat for wildlife, particularly swans. There is extensive open water on the adjacent river providing clear flight-paths, but the core development (ferry terminal and "The Landing") is too enclosed for swans. However, swans attracted to the adjacent river would probably swim into the core development. The adjacent river is unlikely to provide food as it is mostly too deep and Sea Wrack does not currently grow upstream of The Narrows. Therefore, terrestrial food sources would be required. The birds would also need shorelines where they can roost safely, and they would need a source of freshwater. Birds are often seen near a small drain just to the west of the existing Barrack Street jetty, within the area of the proposed Perth Waterfront development, so birds already use the general location. Sir James Mitchell Park and Milyu are also nearby and both support swans. In summary, to encourage Black Swans this project would need to incorporate:

- An island or shoreline facing the open river with a gently-sloping shore where the birds could roost safely. It would thus need to have low levels of disturbance and the birds would need unobscured views all around for some 50m. Black Swans on the river are likely to be familiar with people and dogs, and therefore low levels of disturbance means only that birds are not directly disturbed; a pathway with people and dogs within 25m would most likely be acceptable to the birds.
- Lawn or similar (such as native sedges/grasses) to provide food. Food could be provided artificially but this would need to be tightly regulated to prevent over-dependence and excess nutrients. While native sedges and grasses would be desirable for aesthetic reasons and for other wildlife, lawn is probably necessary as it grows quickly and survives constant grazing.
- Freshwater. Adult Black Swans can rely on a trickle of freshwater and it may be possible to modify existing drains for this purpose.
- Shallow water and open flight-paths are existing features of the site.

Even with the above features included in the design, space around the Perth Waterfront development is limited. Small numbers (2-10) of Black Swans could almost certainly be attracted to the site, and indeed two birds have been seen quite regularly in the area recently (see cover photo). However, a different approach would be to complement the Perth Waterfront development with habitat creation on Perth Water, where large areas of shallows would have great potential for swan habitat creation. If suitable material were available, it might be possible to recreate the sandbars and sand-flats found at Alfred Cove in the middle of Perth Water. This would involve the creation of a sandy island with an area of <1ha, and perhaps 5-10ha of shallows suitable for the growth of Sea Wrack. If some of these shallows were exposed at low

tide, these would also provide foraging habitat for other waterbirds such as the migratory waders. The creation of such waterbird habitat in Perth Water could be expected to bring large numbers (100+) of Black Swans into the area, and they would inevitably be drawn to the Perth Waterfront development if this provided a source of freshwater and a small landing beach for the birds.

Point Fraser

This is an existing foreshore wetland development which may already attract the occasional swan. The wetland may be suitable for swans (fresh, shallow and with lawn and sedges for food), while disturbance levels are probably low, but the wetland is small, not part of the river and there are busy roads in the vicinity. Much of the river shoreline is a concrete wall not suitable for swans, with only small lengths of sandy beaches. For Black Swans to use the river and the wetland at this site would require some major changes to the river shoreline.

Heirisson Island

There are developments planned for Heirisson Island and it already has some areas of swan-friendly shoreline, shallow embayments and some terrestrial food. Access by people and dogs is also regulated so levels of disturbance are low. It is too far upstream for reliable supplies of submerged aquatic plants. To encourage Black Swans, this site would need to include:

- Some secure shoreline roost-sites where the birds have unobstructed views. Much of the shoreline on Heirisson Island has riparian vegetation that obstructs views by roosting birds. A low sandbar with no riparian vegetation might be needed.
- Fresh water. At present there appears to be no source of freshwater available on the shoreline.
- Food; probably a larger area of lawn or similar would be needed to provide food. Sites with many swans, such as Lake Monger, have many hectares of reticulated lawn on which the birds forage. Food on such a scale is not needed but the current lawn area is limited and the riparian vegetation is mostly coarse sedges that do not appear to be favoured by swans. A grass such as Kikuyu is favoured by swans.

Mounts Bay/interchange lakes.

Like the wetlands at Point Fraser, these would appear to be suitable for swans although flight paths are restricted; in particular the wetlands are only just long enough and free from obstacles for birds to take off. Black Swans are occasionally observed at this site and can forage on both submerged aquatic plants (probably species of *Potamageton*) as well as lawn. The wetlands are surrounded by busy roads and swans have been killed on the nearby freeway (pers. obs.). The adjacent river has a concrete retaining wall but there are some beaches along the base of this wall. The level of traffic and restricted access probably make the interchange lakes unsuitable for the development of swan habitat without a major re-structuring of the road system. Black Swans probably would use a pedestrian underpass between the lakes and the river if this were created.

East Perth Riverside development.

The Waterbank Precinct within the East Perth Redevelopment Authority's Riverside project is a major project with extensive earthworks which will create a small harbour with a broad entrance into the river. This harbour is not as enclosed as that of the Perth Waterfront development, so would provide more ready access to swans. Waterbank is close to Burswood where swans

already occur on fresh water lakes and sometimes on the river. Included in the Waterbank proposal are some swale wetlands for the treatment of stormwater, and a foreshore reserve with paths to the east for passive recreation. The swale wetlands are of particular interest as if large enough, they may be able to support breeding swans. This project thus has several features that could be attractive to swans. In summary, to encourage Black Swans this project would need to include:

- Swale wetlands designed to encourage swans, such as by ensuring permanent freshwater, open shorelines in some areas and pathways that do not separate the wetland from the river.
- River shoreline would need to be gently sloping and to include roosting sites with good visibility and low levels of disturbance.
- Terrestrial food such as lawn.
- Shallow water and open flight paths are existing features of the site.

Claisebrook Cove.

It was considered that developments in recent decades render this area unlikely to be suitable for modification to encourage swans. Any future modifications should consider the key features attractive to swans as outlined above.

## CONCLUSIONS

Of foreshore developments in the City of Perth, the Perth Waterfront Project and the Waterbank Precinct within the East Perth Riverside Development have great potential to encourage swans, while developments proposed for Heirisson Island may also be suitable. The Perth Waterfront Project would be particularly desirable as it is so close to the centre of Perth, while Waterbank has potential to support swan breeding if properly designed. Waterbank also has greater flexibility in terms of area and opportunity to create a range of habitats. Perth Waterfront is more restricted in area than Riverside, but the opportunity exists to create complementary habitat within Perth Water to attract large numbers of swans, which would then be attracted to Perth Waterfront by a supply of freshwater. Such a complementary development would have considerable flow-on benefits to other wildlife, as it would create environments that have largely been lost around the river due to development.

Figure 1. Viewed from King's Park, filling of Mounts Bay for the Narrows Interchange in the late 1950s (photographer unknown).

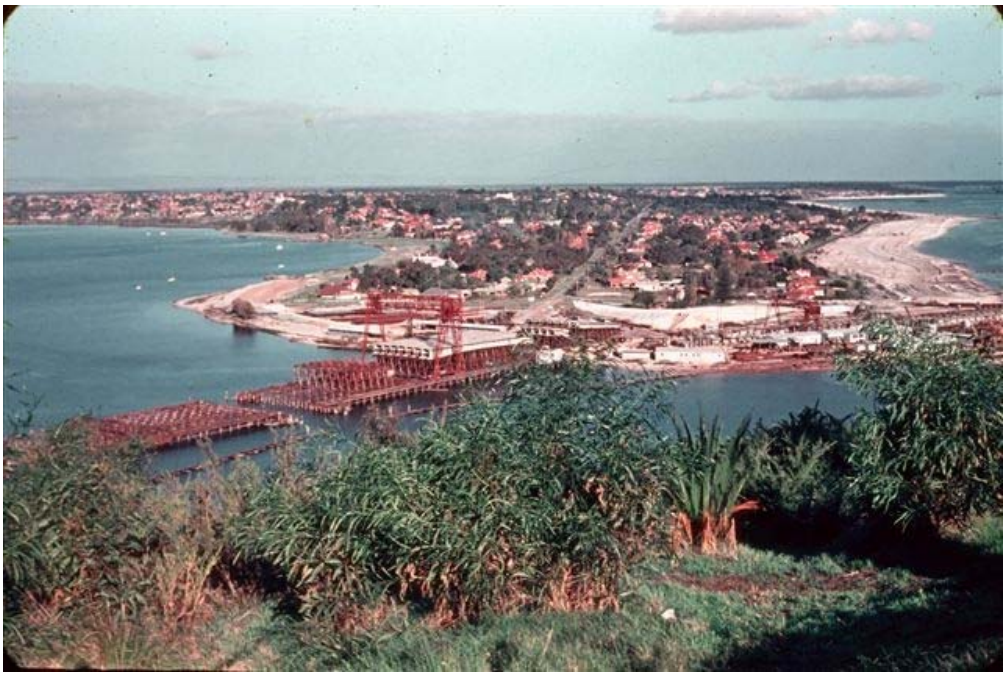

Figure 2. Viewed from King's Park, construction of the Narrows Bridge and filling of the entire western shoreline of South Perth for the first section of the Kwinana Freeway (photographer unknown).

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