

14.0 FRESHWATER LAGOONS

The lagoons of the Darwin Harbour region are seasonal or permanent freshwater wetlands contained in generally shallow, rounded depressions (Figure 14.1). The lagoons fill during the wet season from catchment drainage and the direct interception of rainfall. They continue to retain water in the dry season due to a layer of organic mud and clay that inhibits the seepage of water to the groundwater below. Over the dry season, water levels drop due mainly to evaporation and transpiration by aquatic plants, though the rates of water loss differ greatly between lagoons (Figure 14.2).

An inventory of the location of lagoons in the region, covering an area of 2800 km², was recently undertaken. This desktop survey used aerial photographs at a scale of 1:10,000. The survey area did not include the northern part of Gunn Point peninsula, where many lagoons occur, because there was no coverage by aerial photography. The lagoons were identified from digital versions of the photos, their locations and boundaries marked, and area calculated. The extent of a lagoon was defined by a change from aquatic to terrestrial (dryland) vegetation.



Figure 14.1. Woodford's Lagoon at the end of the 2003/04 wet season.

The survey identified 137 freshwater lagoons, covering a total area of approximately 1470 ha when full. Individual lagoon sizes range from as small as 0.09 ha (900 m²) to 115 hectares. Over 90% of lagoons were between 0.1 and 100 ha, with the most common being between 1 and 10 ha as shown in Figure 14.3.

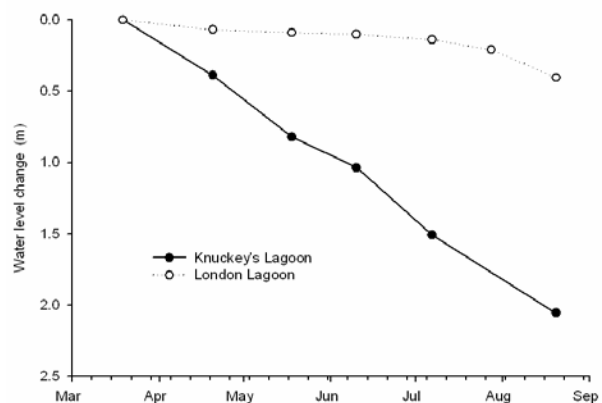


Figure 14.2 Water level changes in two contrasting lagoons in 2004.

Lagoons provide important feeding and breeding habitat for waterbirds and freshwater turtles, and act as refuges for many birds during the dry season. At Knuckeys Lagoons, on the outskirts of Darwin, more than 70 bird species have been observed, including a number of protected migratory birds.

A diverse range of aquatic plants is also found in the lagoons. The clear waters of the lagoons allow the prolific growth of aquatic plants. Vegetation cover and the types of plants change considerably as water levels drop.

Freshwater lagoons are vulnerable ecosystems because they can act as sinks (collection points) for nutrient, contaminants and sediment contained in run-off from the surrounding land. Pesticides, heavy metals, hydrocarbons (e.g. oil) and nutrients that originate from agricultural and urban uses within the catchment may accumulate in the lagoon sediments. At Knuckey's Lagoon, which is surrounded by horticulture and urban land-uses, no pesticides have been found in the sediments however. The lagoons are also vulnerable to any changes to drainage in their catchments.

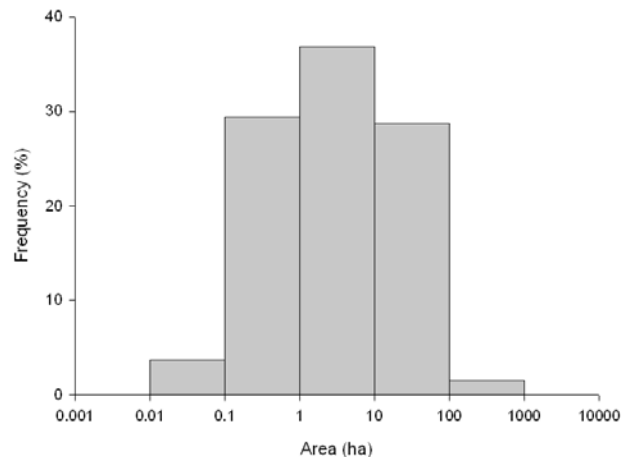


Figure 14.3. The relative frequency of lagoon areas in the Darwin Harbour region.

Other threats include invasion by aquatic weed species that have the potential to choke these small wetlands and reduce their biodiversity and value as a feeding ground for native animals. The outbreak of *Cabomba* in Marlows Lagoon provides a warning of the potential impacts of aquatic weeds (See Section 9.0). Some lagoons on the Adelaide River floodplain have been entirely covered by thickets of *Mimosa pigra* and are no longer distinguishable as open bodies of water.

Feral animals, in particular pigs and buffalo, also pose a threat to the integrity of the lagoon systems. Wallowing and rooting lead to extreme ground disturbance that can

affect the growth and biodiversity of the aquatic flora. The arrival of the cane toad is likely to impact negatively on native lagoon fauna.



Figure 14.4. The white snowflake lily, *Nymphaoides indica*, is a common aquatic plant in the lagoons of the Darwin region

Whilst a basic inventory of the location and extent of freshwater lagoons of the Darwin region has been completed, little is known about their flora and fauna, water quality and hydrology. The vegetation and water quality of Knuckey's Lagoons is best known of all the lagoons. Currently, the water levels and water quality of 15 lagoons in the region are being monitored, and will be reported on in 2005.

Conclusion

There are numerous lagoons in the Darwin Harbour region, yet our knowledge of their ecology, water quality and hydrology is limited. Lagoon ecosystems are vulnerable to a range of threats, including the accumulation of contaminants, changes in drainage and invasion by introduced plant and animal species.

Further Reading

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Haig, T. and Townsend, S. (2003). An understanding of groundwater and surface water hydrology of the Darwin Harbour Plan of Management area. In 'Proceedings: Darwin Harbour Region: Current knowledge and future needs'. (Ed. Working Group for the Darwin Harbour Advisory Committee) pp 122-149. Department of Infrastructure, Planning and Environment, Darwin.

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