The shorebirds are back in town

It's a cool, clear morning in Esperance and the lake waters are still. We head out not knowing what the day might bring. Binoculars at the ready, and it's on – thousands of waterbirds are waiting to be identified and counted. If only they would stay still…

by Jennifer Higbid, John Lizamore and Adrian Pinder

Surveying waterbirds is not the easiest activity to undertake. Not only are the species often tricky to identify but the birds can be flighty and will take off at the smallest noise. Counting them and tracking their movement across wetlands takes concentration and patience. There are consolations though – watching huge flocks twist and turn in the air is amazing.

The Department of Parks and Wildlife has been monitoring waterbirds at selected Esperance wetlands as part of the State Salinity Strategy since 2006. These surveys follow on from those done in the 1980s as part of the Waterbirds in Nature Reserves project. The current surveys are designed to provide information on waterbird diversity and abundance, which will help guide management of the wetlands. In particular, the information will indicate how waterbirds have responded to the manipulation of water levels and varying water chemistry within some of the wetlands.

Monitoring is conducted within two wetland systems in the Esperance area – the Lake Warden system and the Lake Gore and Quallilup wetland system. Both are listed as Wetlands of International Importance under the Ramsar Convention.

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LAKE WARDEN SYSTEM

The Lake Warden system is made up of more than 50 wetlands located just to the north and east of the town of Esperance. These include Lake Warden itself in the west, a central suite of wetlands including Windabout Lake, Woody Lake and Lake Wheatfield linked by a series of channels, and an eastern suite of wetlands, which are also largely connected and includes Station Lake, Mullet Lake and Ewans Lake.

This Ramsar site has been recognised as a unique wetland system in the south-west of Western Australia. The diversity of wetlands within the system is quite remarkable, with even adjoining wetlands supporting different plants and animals. The wetlands are also important in providing habitat and drought refuge for a variety of waterbirds, including 25 species listed under international agreements to protect migratory shorebirds. Many of these species travel long distances to avoid the harsh northern hemisphere winter and, on arrival in Esperance, are greeted with wetlands brimming with food. Lake Warden, in particular, supports a large number and variety of shorebirds.

Intensive clearing in the catchments, and encroaching urbanisation has resulted in changes to the hydrology of the wetlands in the Lake Warden system. Rising groundwater levels and increased surface run-off have led to higher water levels and longer periods of inundation. To complicate matters, between 1999 and 2009 there was an increase in rain during summer, when these wetlands would usually dry out with the sandy shores exposed. Changes to the hydrological

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Main Australian shelducks shelter at Lake Gore during their moulting stage.
Photo – Rob Drummond/Lochman Transparencies

Left Mullet Lake.
Photo – Jennifer Higbid/Parks and Wildlife

Above Hooded plovers use a number of wetlands in the Warden and Gore wetland systems and have bred at Lake Warden since water levels have dropped.
Photo – Dave Watts/Lochman Transparencies

Above right Kepwari Trail leads visitors through Woody Lake Nature Reserve.
Photo – Jennifer Higbid/Parks and Wildlife

Where can I watch waterbirds in Esperance?

The Kepwari Trail is a 3.6km interpretive walk trail located within Woody Lake Nature Reserve, which is a five-minute drive from the centre of Esperance. The trail winds through fringing sedgeland, heathland, banksia woodland and over dunes to give panoramic views of the central suite of the Lake Warden system Ramsar site and catchment. The trail includes sections of raised timber boardwalk and there are various information panels along the way. As part of the trail, two bird hides have been installed at Lake Wheatfield where visitors can observe waterbirds without disturbing them. There is also a canoe trail that winds through the interconnecting channels between Lake Windabout, Woody Lake and Lake Wheatfield. Lake Warden generally offers excellent shorebird viewing and has easy walk-in access. More details are available from Parks and Wildlife's Esperance District office.

regime of the wetlands meant that the shores, which are important habitat for shorebirds, were largely submerged and much of the vegetation surrounding the wetlands showed signs of poor health from prolonged inundation. As a result of the higher water levels, the composition of waterbird communities changed, with fewer shorebirds using the wetlands.

In autumn 2009, following rigorous hydrological studies, a drainage program was started to lower the water depth in the central suite of wetlands, and consequently in Lake Warden. A gravity pipeline was constructed from Lake Wheatfield to Bandy Creek, to drain excess water from the wetland system. Since then, thanks to the drainage intervention and a number of average to below-average rainfall years, lower water levels have been recorded in these wetlands.

LAKE GORE

The Lake Gore Ramsar site is located about 34km west of the town of Esperance and comprises Lake Gore and a large area of the nature reserve directly to the south of it that extends to the coast. Downstream is a system of interconnected wetlands which includes Lake Quallilup – the terminal lake of the system that has been cut off from the ocean for more than 10,000 years. Some of the adjacent wetlands just outside the Ramsar site boundary, such as Lake Carbul, are also very important for waterbirds.

The site provides an important waterbird habitat with up to 14 species listed under international migratory bird agreements recorded there. Importantly, Lake Gore provides refuge for thousands of waterbirds, particularly the Australian shelduck (*Tadorna tadornoides*) during the moulting stage of its life cycle when it is flightless. When threatened, a moulting shelduck will try to move across the water by flapping furiously, resembling a clumsy attempt at butterfly stroke. While moulting, waterbirds are vulnerable to predation and, due to its large size, Lake Gore provides an important safe haven.

Like the Lake Warden system, Lake Gore and associated wetlands are threatened by the impacts of altered hydrology, particularly increased water levels and inundation. Higher water levels in Lake Gore, as a result of altered hydrology in the catchment, have resulted in a change in waterbird composition. These levels favour waterbirds like ducks that prefer deep water, while shorebirds will struggle with the reduced area of sandy shores. One species to watch is the hooded plover (*Thinornis rubricollis*), an uncommon shorebird that has been recorded at Lake Gore in large numbers in the past and is directly impacted by the loss of beach habitat associated with

Left Boats and high-powered telescopes are used to carry out surveys.
Photo – Jennifer Higbid/Parks and Wildlife

Below left Vegetation recovery at Lake Warden.
Photo – John Lizamore/Parks and Wildlife

higher water levels. This species now uses smaller wetlands like Lake Carbul, which is dry in summer.

WHY MONITOR?

Monitoring the diversity and abundance of waterbirds within the wetlands of Esperance is important from a local, national and international perspective. Many of the waterbirds recorded are listed under Western Australian and Australian biodiversity conservation legislation, and also under international agreements for migratory species. Monitoring of these important species helps determine how they are faring and will identify when to instigate management actions if required.

Waterbird communities can be sensitive indicators of environmental change and the results of monitoring are important to guide adaptive management. Understanding natural variation is also crucial in the management of wetlands as they are such dynamic systems. Long-term monitoring provides information on trends in waterbird diversity and abundance, and helps us to recognise changes which may be due to human activity. The information from monitoring also informs wetland management planning and can indicate whether current management activities are working. An important role of this monitoring program is to determine whether the waterbird communities have responded to the drainage intervention and lowering of water levels in the Lake Warden system Ramsar site, especially in Lake Warden. It also gives an indication of whether the ecological character of the wetland systems is changing.

BOATS AND PLANES

Waterbird monitoring is currently conducted twice yearly in October–November and February. These surveys provide information about how all waterbirds are using the systems. In particular, the spring survey aims to record the arriving shorebirds and include counts of moulting birds, such as the Australian shelduck at Lake Gore. The summer survey is timed to capture peak shorebird activity which generally coincides with lower water levels – creating shallow wading zones and wide beach areas.

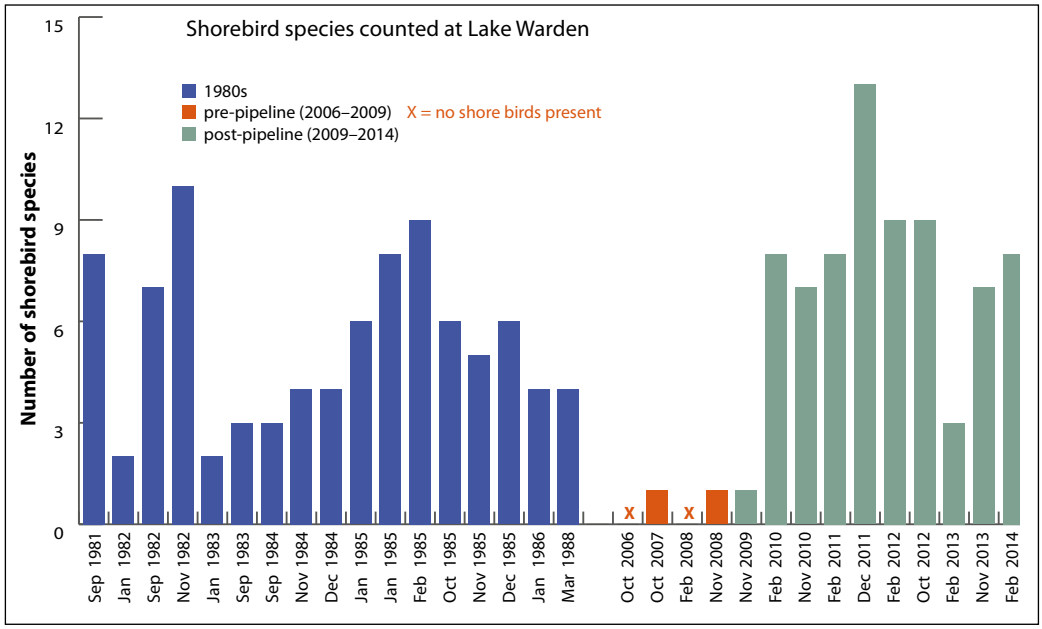
To do this, Parks and Wildlife staff use different modes of transport, depending on conditions at the time and available resources. The large and deeper wetlands like Warden and Gore lakes, and the central suite wetlands, are navigable by a small boat. Birds are observed from the boat using binoculars but it can be difficult while in motion, so regular stops are made along the shore. Once on solid ground, a telescope, which gives higher magnification, is set up on a tripod and the horizon can be scanned. We generally walk around the shallower wetlands and try to stay close to the edge so as not to disturb the birds.

When resources permit, aerial counts are undertaken using a fixed-wing plane. Aerial counts are useful for surveying multiple wetlands in a relatively short time and can prevent double counting or missing waterbirds as they move between wetlands. However, aerial counts can miss smaller and difficult-to-spot species. So, where possible, a combination of ground and air counts is used.

WHAT HAVE WE FOUND?

Thankfully, the engineering intervention and drainage management program has reduced water levels in Lake Warden and the central suite wetlands to historical levels. Since the construction of the pipeline at Lake Wheatfield in 2009 there has also been a succession of average to below-average rainfall years resulting in less inflow to Esperance's wetlands. The vegetation has responded well to the lower water levels with recovery evident in the sedge communities and fringing trees, some of which were thought to be dead.

Waterbirds have also responded to the engineering work, particularly at Lake Warden, where the restoration of shallower depths has seen the range of waterbird species return to something more like it was in the 1980s, with fewer ducks and diving species such as cormorants but many more shorebird species. The graph above shows the number of shorebird species counted at Lake Warden during surveys in spring and summer over three periods: in the 1980s (blue columns), 2006 to early 2009 before the drain was installed (orange columns) and since the drain was installed in April 2009 (green columns). In the 1980s, Lake Warden was usually shallower than 1m in spring and summer and there were frequently more than three or four species using the expansive shallow water and



beach habitats. Depth at Lake Warden increased significantly during the 1990s to be consistently more than 2m and counts between 2006 to early 2009 recorded a maximum of just one species of shorebird. Since 2009, depths have again declined to below 1.4m, increasing the amount of shore habitat, and there has been a return to higher numbers of shorebird species at the lake, including numerous migratory species. This is an excellent result and demonstrates that hydrological interventions are a useful tool for restoring wetlands.

MANAGING FOR THE FUTURE

The waterbird monitoring at Esperance is an example of the importance of science in informing landscape-scale management. It also shows that an engineering intervention can achieve positive results and, when implemented appropriately, can help wetland systems to recover. While climatic events cannot be controlled, targeted on-ground management activities guided by science can prove successful. The knowledge gained from this project may also be useful for other wetland sites in the south-west.

Wetlands can be highly resilient ecological systems and when given a chance they often bounce back. Esperance's wetlands are a great case in point but we need to remain vigilant. Long may the shorebirds return.

Right Shorebirds at Lake Warden.
Photo – John Lizamore/Parks and Wildlife

Jennifer Higbid is an environmental officer with Parks and Wildlife's Wetlands Section based in Kensington. She can be contacted by email (jennifer.higbid@dpaw.wa.gov.au).

John Lizamore is a recovery catchment officer based in Parks and Wildlife's Esperance office. He can be contacted by email (john.lizamore@dpaw.wa.gov.au).

Adrian Pinder is a principal research scientist with Parks and Wildlife's Wetlands Conservation Program based at Kensington. He can be contacted by email (adrian.pinder@dpaw.wa.gov.au).

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For more information about the Esperance Ramsar sites visit the 'wetlands' section of Parks and Wildlife's website at www.dpaw.wa.gov.au.