Visitors cannot help but notice the wetlands that form an arc north of Esperance town. Pink Lake is promoted as a tourist attraction and those interested in waterbirds may have used the walking trails and bird hides on the lakes in Woody Lake Nature Reserve. The drive out to Cape Le Grand and Cape Arid National Parks also takes visitors past Mullet Lake and Ewans Lake. In fact, there are about 90 wetlands in the Warden system and 98 species of wetland associated birds have been recorded using them. Designated a Ramsar site in 1990 and then a Recovery Catchment in 1996, and with some of the individual wetlands considered to be of national importance, the conservation significance of these wetlands is well recognised.

Surveys of these wetlands in the 1980s by Birdlife Australia (then Royal Australasian Ornithologists Union) and the Department of Environment and Conservation (DEC) identified 65 species of waterbirds, including 25 shorebird species. Many of the wetlands had large areas of beach and shallow wading zones which expanded in summer as water levels declined. However, from about the late 1980s depths at Lake Warden and the central suite of wetlands (Wheatfield Lake, Woody Lake and Lake Windabout) began to increase, doubling over the next two decades. Increased volumes of water in these wetlands resulted from altered catchment hydrology, together with a number of large episodic rainfall events. While the latter were largely natural (ignoring possible climate-change effects) excess water from the catchment prevented depths declining between such events. This is best illustrated at Lake Warden where there is an especially long record of depth measurements

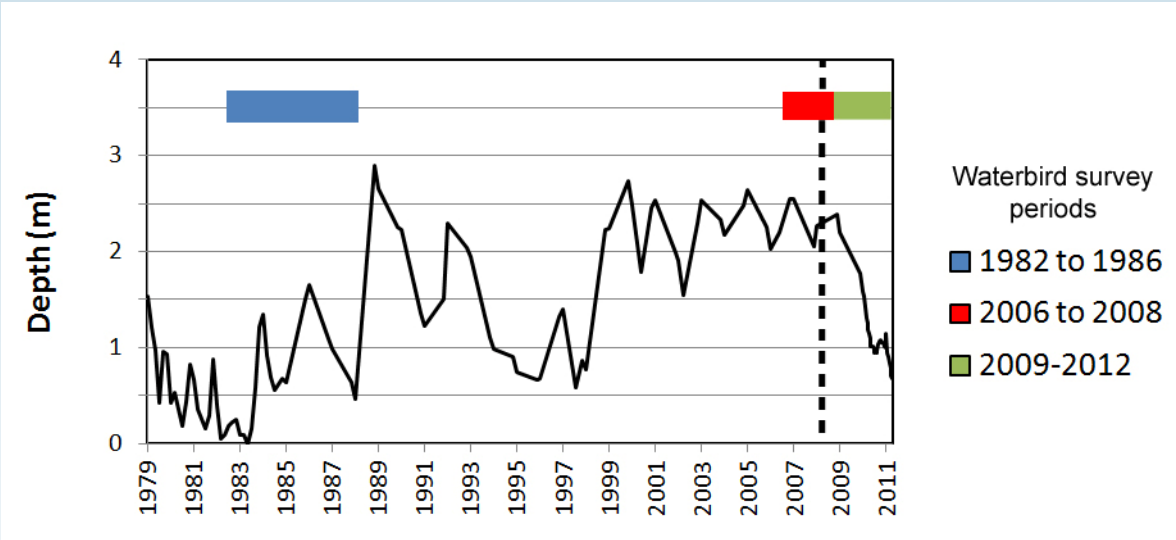

Figure 1: Lake Warden depths and bird survey times

(Figure 1, which also shows timing of waterbird surveys). Persistently elevated depths caused decline in the *Melaleuca* and sedges fringing the lakes and significant changes in waterbird habitats, including reduced beach and shallow water zones. Eighty five percent of waterbird species that used the Esperance wetlands in the 1980s have been recorded since 2006, albeit with significant changes in community composition at many individual wetlands. For instance, there are now more diving species such as cormorants and musk ducks on some of the deeper wetlands. One significant change has been the virtual loss of shorebirds from those wetlands that have experienced greatest increases in depth. Figure 2 shows much lower richness and abundance of shorebirds at Lake Warden between 2006 and 2008 (surveys represented by red columns) compared to the 1980s (blue columns).

The Recovery Catchment Program, funded by the State Salinity Strategy and led by DEC in conjunction with community stakeholders, selects and manages catchments in the south-west agricultural zone to preserve and/or restore biodiversity assets. In the Warden Recovery Catchment, recovery of the shorebird populations, particularly at Lake Warden where large shorebird counts had been made in the past, was a primary objective. To plan for this, engineering options to reduce lake depths were investigated and one of these, a gravity fed pipeline from Lake Wheatfield to Bandy

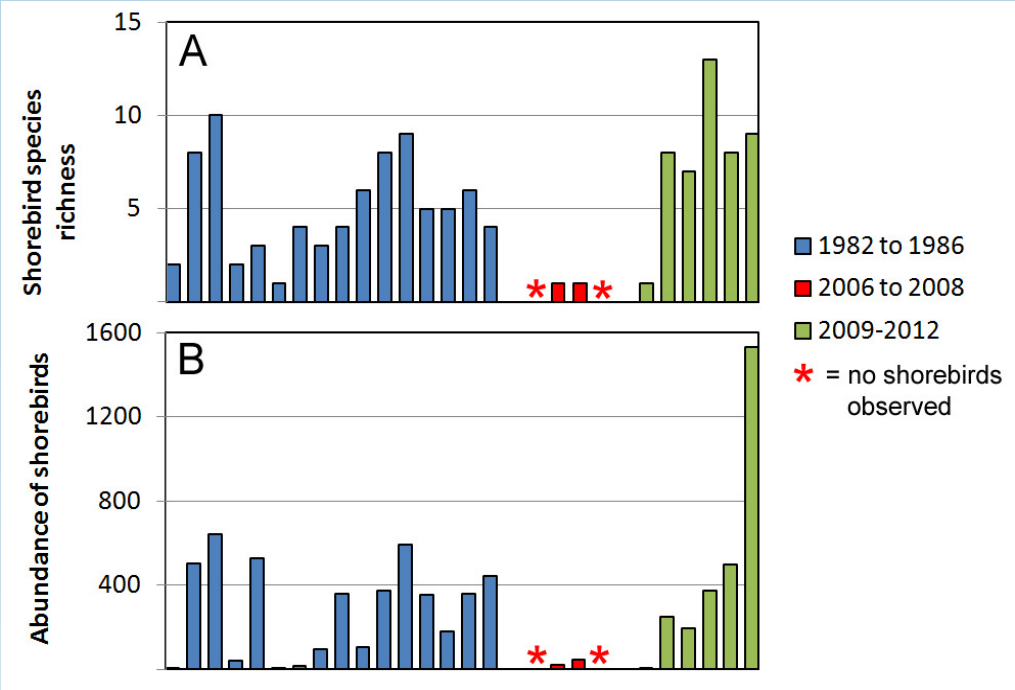

Figure 2: Lake Warden shorebird species richness and abundance

Creek, was installed and began operating in April 2009 (dashed line on Figure 1). This has already had the effects of reducing depths in the central suite of wetlands and contributed to reduced depth at Lake Warden (Figure 1) through reduced frequency of overflows from Windabout Lake. In these wetlands, fringing vegetation is recovering, with melaleucas that were presumed to be dead resprouting and new trees and sedges germinating. Surveys over the most recent years at Lake Warden (green columns in Figure 2A) are showing a return to high shorebird diversity, with 13 species recorded in November 2010. Significant recent observations include 768 red-necked stint, 29 curlew sandpiper, 53 hooded plover and a bar-tailed godwit. It is not only diversity that is returning, but abundances have also increased in the last couple of years. Figure 2B shows that abundance of shorebirds (other than banded stilt) has returned to levels observed during the 1980s. Banded stilt are excluded from this graph because they tend to roam across southern and central Australia in large numbers seeking intermittently inundated salt lakes, often not returning to any one lake in high numbers for many years. They have been recorded at Lake Warden in the last couple of years, but not in the high numbers they were occasionally reported in the 1980s.

While it is early days in the recovery of these wetlands, the results so far are encouraging and give hope that the Warden wetlands will continue to be part of a mosaic of wetlands in the south-west that support endemic and migratory waders.

Footnote: Surveys since 2006 have been funded by DEC and South Coast NRM, with the latter funding from a Caring For Country Grant from the Australian Government. A survey in 2006 and 6 surveys since 2009 have been carried out by DEC whereas 3 surveys between 2007 and 2008 were carried out by Bennelongia Pty Ltd.

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