Flora assessment

Rakali Ecological Consulting Pty Ltd was engaged to assess the ecological values of five wetlands and surrounding lands in the Kerang Lakes Ramsar Site. These wetlands are currently subject to an investigation that is exploring the possibility of their removal from the irrigation conveyance system of the Torrumbarry Irrigation System (TIS). This would restore a more natural hydrological regime and lead to water savings throughout the catchment.

The current assessment included mapping of vegetation communities, Index of Wetland Condition assessments and collection of flora and fauna data. Surrounding lands were also assessed to inform a potential project to create a bypass channel around the lakes. The findings of their assessment are reported in Rakali Consulting (2013).

The diversion of water would require the construction of a pipe or channel system through public and private lands surrounding the lakes. As this scheme could potentially impact on native vegetation, an assessment was undertaken in these areas to investigate the type and condition of habitats. This included a likelihood of occurrence assessment for Matters of National Environmental Significance (MNES) and species and communities listed under the Flora and Fauna Guarantee (FFG) Act.

An assessment of habitat occurring within the proposed bypass area revealed that the vast majority of potential Environment Protection and Biodiversity Conservation Act (EPBC) and FFG listed species are unlikely to rely on these areas. This is due to either a lack of suitable habitat or degradation of the habitat that is present.

The EPBC listed Chariot Wheels occurs in remnant vegetation south west of Reedy Lake. Winged Peppercress may occur in areas of remnant vegetation west of Reedy Lake or along the railway-line, south east and south west of Racecourse Lake.

The areas west of Reedy Lake and along the railway line support some of the better quality vegetation of the proposed bypass area. The area west of Reedy Lake is also important due to its function as a buffer to the lake.

Native vegetation within the study area has been highly modified since European occupation by processes such as land clearing, major changes to hydrological regimes, salinisation, weed invasion, grazing of hard-hoofed stock animals and rabbits and other land management practices.

Despite these modifications, biodiversity within the study area is still relatively high. Much of the vegetation that has developed in response to environmental changes still in many ways resembles natural vegetation associations. This vegetation still supports a number of threatened plant species, and in association with other habitat components including the presence of abundant, relatively good quality water and many dead trees and large logs, provides habitat for a diverse and abundant fauna. This fauna includes the many migratory and rare and threatened birds for which the Kerang Lakes are renowned and are a large part of the reason the area has been listed on the Ramsar convention of internationally significant wetlands.

Comparison of previous ecological data ((Ho, Roberts et al. 2006), (O'Donnell 1990)) with that collected in 2013 indicate that biodiversity and ecological condition in the wetlands of the study area are declining, and are likely to continue on this trajectory if current conditions, including stable high water levels, are maintained.

Future changes to the hydrological regimes of the study area’s wetlands, including instigating new wetting and drying cycles, has the potential to have both positive and negative ecological consequences, depending on how the changes are implemented and how biota and the abiotic environment respond to those changes.

Potential benefits of periodic wetting and drying may include regeneration of and improved diversity in wetland vegetation communities, and a subsequent improvement in habitat quality for many native fauna. For example, Tangled Lignum at Middle Lake has only been reproducing vegetatively since the level of the wetland has been manipulated by its inclusion in the Torrumbarry Irrigation Scheme. At this same wetland dead standing and fallen River Red Gums provide important habitat for nesting and roosting water birds and basking turtles. Standing dead Red Gums will eventually fall over and all timber will eventually rot away, depriving water birds and turtles of important habitat resources.

Under a suitable wetting and drying regime both Tangled
Lignum and River Red Gums will regenerate from seed, providing a more sustainable habitat in the long term. Wetting and drying may also assist in the re-establishment of the beds of submerged and floating macrophytes such as Eel Grass (Vallisneria americana), Pondweed (Potamogeton crispus) and Lake Milfoil (Myriophyllum salsugineum) that occurred in Middle Lake and the Water Ribbons (Triglochin procer) that occurred in Little Lake Charm up until 1990 (O'Donnell 1990). None of these species were observed during field studies for this investigation despite intensive searching.

The removal of stable, high water levels may also assist in the control of various environmental weeds, including *Salix* sp (Willows), *Paspalum distichum* (Water Couch) and the potentially catastrophic *Eclipta prostrata* (False Daisy) and introduced fish such as Carp.

Kingsford and Porter (2006) compared the diversity and abundance of waterbirds on wetlands which were kept artificially permanent with those with natural wetting and drying cycles. They found that waterbird density was ten times higher on unregulated wetlands than on wetlands that were artificially permanently flooded. Waterbird diversity on wetting and drying wetlands was almost twice as high as those that were permanently inundated. Species groups that were most noticeably more diverse on wetting and drying wetlands were ducks and small grebes, herbivores and small wading birds. It has been postulated that the diversity of these species groups is most influenced by wetting and drying as they are reliant on diverse assemblages and high biomass of aquatic plants and macro-invertebrates, which are both negatively affected by permanent inundation (Kingsford, Jenkins et al. 2004).

The loss of a drying phase in naturally intermittent lakes and wetlands is recognised as a major degrading process (Briggs 1988). Productivity and habitat and species diversity are reduced in naturally intermittent wetlands that are permanently flooded (Gawne and Scholz 2006). Gawne and Scholz (2006) have developed a conceptual model to facilitate management of ephemeral deflation basin lakes, such as the Reedy Lake system. They suggest that although rehabilitation might not require complete drying, restoration of a hydrological cycle that produces changes in trophic structure and the development of vegetation on the lake bed will be important considerations in managing these systems.

Briggs (1988) provides guidelines for the hydrological management of inland wetlands in southern NSW, which are relevant to wetlands in the study area. In summary these guidelines suggest that:

1. Wetlands require periodic drying to maintain their natural productivity
2. As a general rule wetlands should not be flooded continuously for more than 4 years
3. Wetlands should preferably be flooded in late winter or early spring
4. Wetlands should remain inundated continuously for at least 4 to 6 months to ensure appropriate conditions for plant and invertebrate succession, and for successful reproduction of waterbirds.

Potential risks of reducing water inputs into the study areas wetland systems include a reduction in vigour or displacement of plant species or communities such as Tall Marsh or the aquatic form of Tangled Lignum in the Reedy Lake system, which currently provide important habitat and nesting substrate for colonial nesting birds, and weed invasion onto areas of mud exposed by receding water. While native species may also colonise this habitat, there is a risk that weed propagules may out-number, or outcompete, native species and that due to the extended period that the wetlands have been kept full that native seed banks would be depleted, or find the sediments that have accumulated on the wetland floor to be an unsuitable substrate for germination and establishment.

If a decision is made to alter the hydrological status quo, fine-scale ecological monitoring will be necessary to determine the type and amplitude of positive or negative changes and to inform whether trialled water regime changes should be continued, modified or abandoned.

For further information contact Goulburn-Murray Water

References


