

# Looking after Australia's Ramsar wetlands

# Ramsar Secretary General visits Australia

Louise Duff (WetlandCare Australia), Ebony Holland (Australian Department of the Environment) and Janet Holmes (Victorian Department of Environment and Primary Industries)

During his trip to Australia for the World Parks Congress, Ramsar Secretary General Dr Christopher Briggs visited two Ramsar sites near Melbourne and met with Australian wetland stakeholders from across the country at the Ramsar Forum in Sydney.

The primary purpose of Dr Briggs' trip to Australia was to present at the World Parks Congress, held at Sydney Olympic Park in November 2014. Dr Briggs was accompanied by Mr Llewellyn Young, Senior Regional Advisor for Asia and Oceania from the Ramsar Convention Secretariat.

The Congress is a landmark global forum on protected areas that is held once every 10 years. The aim of the Congress was to share knowledge and innovation, and set the agenda for protected area conservation for the decade to come. The Congress also provided a platform to discuss and find solutions to integrated approaches for conservation and development.

Dr Briggs was involved in a number of World Parks Congress events, including sessions relating to the benefit of protected areas for human health and wellbeing, using protected areas to support human life through the provision of food, water and disaster risk reduction, and the implementation of Key Biodiversity Areas.

Wetlands were a key feature of the Congress, with many of the sessions and side events acknowledging their important role in protected areas, and their contribution to climate change adaptation and mitigation, supporting Indigenous cultures and helping to address development challenges. In addition, the



*Dr Christopher Briggs, Ramsar Secretary General, met with Parks Victoria staff on a site visit to two Ramsar wetlands near Melbourne, Victoria. From left: Siobhan Rogan, Bernie McCarrick, Dr Chris Briggs, Stuart Willsher and Mark Rodrigue* (© Copyright, Andrew Morrison)



*Jenny Tomkins (L) and Ebony Holland (R) (Australian Department of the Environment) with Llewellyn Young (Ramsar Convention Secretariat) on an early morning walking tour of the Sydney Olympic Park wetlands at the World Parks Congress* (© Copyright, Australian Department of the Environment)

Australian Department of the Environment partnered with Parks Australia to run an exhibition booth at the Congress to promote the Ramsar Convention and Australia's 65 Ramsar wetlands.

Prior to attending the Congress, the Victorian Department of Environment and Primary Industries was privileged to host Dr Briggs. Dr Briggs visited the Western Port Ramsar Site and Point Cook Coastal Park and the Western Treatment Plant in the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. He was accompanied by Mr David Papps and Mr Greg Manning from the Australian Department of the Environment. Dr Briggs was able to see firsthand the significant coastal saltmarsh habitat and conservation lagoons at the Western Treatment Plant. He heard from Parks Victoria, Melbourne Water and the Port Phillip and Westernport Catchment Management Authority about the great work they are doing to manage these wetlands and also about some of the challenges they face.

The Department of Environment and Primary Industries also had an opportunity to provide an overview of Victoria's Waterway Management Program which covers rivers, wetlands and estuaries. The Program coordinates state policy with regional planning and delivery and on-ground actions at priority waterways, including at Victoria's 11 Ramsar sites. The Secretary General also heard how environmental water in Victoria is managed by the Victorian Environmental Water Holder.



*Non-government organisations were well represented at the Ramsar Forum, with delegates attending from Western Australia, Queensland and Victoria. Louise Duff, Secretary of the Australian Wetlands Network (L) with Kim Wilson, Program Manager with the Peel-Harvey Catchment Council (R)* (© Copyright, WetlandCare Australia)

The Ramsar Secretary General demonstrated his commitment to working with a diversity of wetland stakeholders by participating in a half-day Ramsar Forum held as a parallel event to the World Parks Congress. The Forum was hosted by WetlandCare Australia in its role as Secretariat of the Australian Wetland Network, with assistance from the Sydney Olympic Park Authority.

The purpose of the Forum was to promote understanding and build capacity for conservation and wise use of wetlands globally and locally. Dr Briggs and Mr Papps gave presentations on the implementation of the Ramsar convention at international and national scales. Ms Louise Duff spoke about the contributions and concerns of the non-government sector, covering a range of campaigns for wetlands under threat.

Speakers from NSW Office of Environment and Heritage, WetlandCare Australia and Sydney Olympic Park Authority presented case-studies on key issues and conservation strategies to manage wetlands, and Mr Young facilitated a discussion to promote dialogue between stakeholders exploring conservation concerns in Australia. The forum also featured a presentation by Professors Max Finlayson and Jenny Davis covering the outcomes of the Oceania Wetland Futures workshop held in October 2014.

The Forum was a great success, bringing together over 60 delegates representing government agencies, non-government organisations and community volunteers, Ramsar site managers, scientists, industry and international delegates from the World Parks Congress. A key outcome was the opportunity for non-government organisation delegates to build relationships with government decision-makers and improve dialogue to protect wetlands under threat. Dr Briggs hopes “it will be the first of very many events that we can hear about to link up wetlands professionals and organisations devoted to wetlands in Australia”. Presentations by the presenters at the Ramsar Forum can be found here: [www.wetlandcare.com.au/index.php/our-work/current-projects/ramsar-forum-on-the-wise-use-of-wetlands-in-australia](http://www.wetlandcare.com.au/index.php/our-work/current-projects/ramsar-forum-on-the-wise-use-of-wetlands-in-australia).

It was an honour to host Dr Briggs and Mr Young during their trip to Australia, and we look forward to continuing to work closely with the Ramsar Convention Secretariat to promote the conservation and wise use of wetlands.



*Ramsar Secretary General, Dr Christopher Briggs, speaking at the Ramsar Forum at Sydney Olympic Park*  
(© Copyright, WetlandCare Australia)

Further information on Australia's wetlands and 65 Ramsar sites can be found here: [www.environment.gov.au/wetlands](http://www.environment.gov.au/wetlands).

# Defence and Fitzroy Basin Association: Managing a unique Ramsar wetland in Queensland

Australian Department of Defence and the Fitzroy Basin Association Inc.

A Ramsar wetland in Queensland benefits from the effective collaboration between government and non-government organisations.

The Shoalwater and Corio Bays Area (Shoalwater Bay Training Area, in part — Corio Bay) wetland was listed in 1996 under the Ramsar Convention on Wetlands of International Importance. The wetland is situated on the central Queensland coast, north-east of Rockhampton, covering an area of approximately 239 100 hectares.

The wetland is unique in that it covers marine and estuarine waters, and freshwater wetlands on State and Commonwealth land and waters. The marine waters are part of the Great Barrier Reef Marine Park and are one of the major dugong (*Dugong dugon*) protection areas within Australia.

This wetland system comprises a high diversity of ecosystems, high numbers of endemic and threatened species and habitat required by many migratory species. There is the potential for the wetland to be adversely impacted by invasive plant and animal species which would impact the significant environmental value of the Ramsar site.

The Australian Department of Defence (Defence) is responsible for management of the wetlands which exist within the Shoalwater Bay Training Area. Defence recognises the need to work closely with stakeholders and community organisations, such as the Fitzroy Basin Association Inc. (FBA), who have similar interests in achieving positive environmental outcomes.

FBA is the lead organisation for sustainable natural resource management in Central Queensland. Healthy ecosystems are highly valued and the conservation of critical habitat such as the Ramsar wetland complex is

an important focus for the organisation. FBA partners with regional stakeholders to ensure appropriate management practices are considered and implemented.

Defence and FBA have worked collaboratively since 2008 to achieve change on the ground at the site utilising Australian Government funds. Programs have targeted a number of issues which threaten the Ramsar site, including Weeds of National Significance, feral pigs, invasive aquatic species and marine debris on beaches.

Combatting weed incursions has resulted in the improved integrity of native vegetation and increased wetland health. Feral pig control has been innovative to suit the local conditions and has resulted in a decrease in the degradation of wetland and coastal habitat. Debris removal from beaches has reduced the risk to wildlife. Surveys for aquatic pests have shown the wetland to be free of invasive fish species which is critical given the recent discovery of tilapia (a pest species originally introduced for use in aquaria) in the nearby Fitzroy River. Based on these issues, Defence and FBA must be ever vigilant in their joint efforts to combat threats to our valuable natural assets.

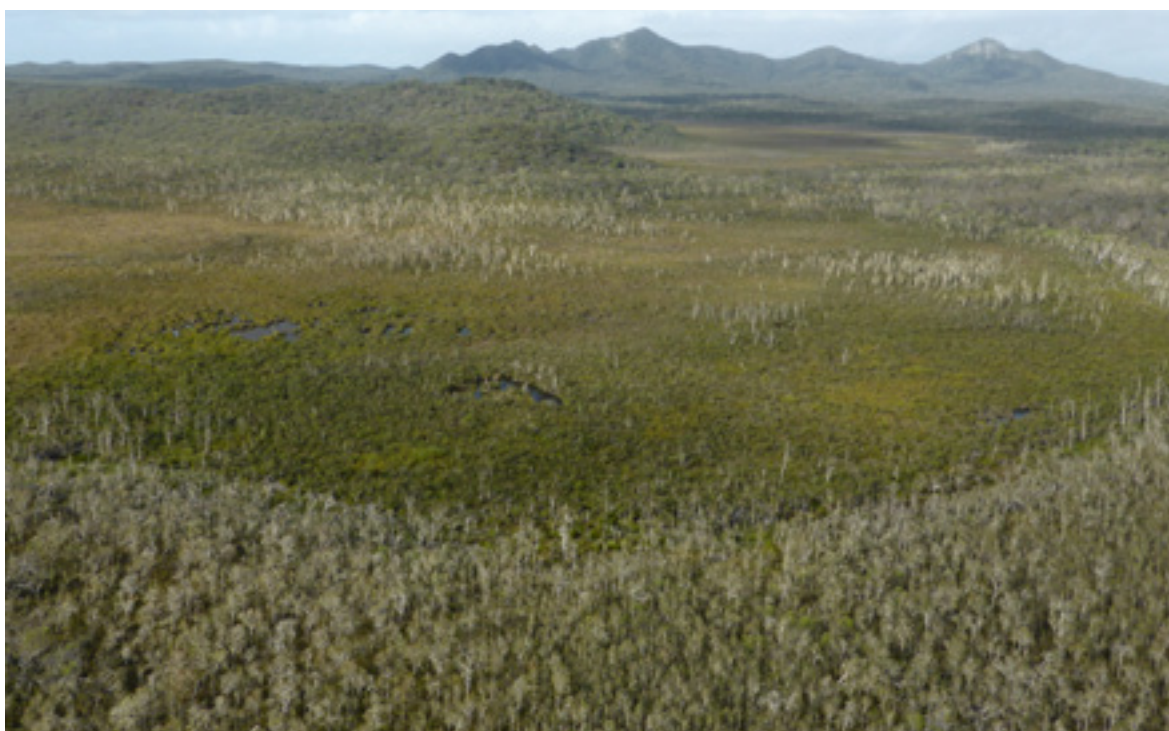
Together Defence and FBA are committed to continue the vital work needed to protect this fragile wetland area for future generations.

For more information on the Shoalwater and Corio Bays Area Ramsar site, please visit:  
[www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=44](http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=44).





*Electrofishing for pest fish surveys is undertaken as part of the management of the Shoalwater and Corio Bays Area Ramsar site in Queensland* (© Copyright, Shane Westley)



*Dismal Swamp is just one of the diverse habitats featured at the Shoalwater and Corio Bays Area Ramsar site* (© Copyright, Tennille Danvers)

# Banrock Station Wetland Complex Ramsar site in South Australia is helping to bring a species back from the brink

Christophe Tourenq (Banrock Station), Tim Field (Banrock Station), Doug Bickerton (South Australian Department of Environment, Water and Natural Resources (DEWNR)), Lee Heard (DEWNR), Ellen Ryan-Colton (DEWNR), Erica Rees (Trees For Life), Tania Kearney (Trees For Life), David Potter (Spiny Daisy Recovery Team)

A critically endangered plant that was not recorded in the wild for almost 90 years is being reintroduced at Banrock Station, South Australia to safeguard it from extinction.

The spiny daisy (*Acanthocladium dockeri*) is a small whitish-grey shrub which grows up to 50cm tall with tiny yellow flowers. It was first collected on 28 October 1860 during the Burke and Wills expedition, by the botanist and doctor of the expedition, Dr Hermann Beckler, near Lake Pamamaroo, by the Darling River in central western New South Wales.

Along with another 1000 specimens collected by Beckler during the expedition, the spiny daisy collection was sent to Ferdinand von Mueller at the Herbarium in Melbourne, who described it as a new species for science in his series of papers *Fragmenta Phytographiae Australiae* (1861). The species was not seen again until 50 years later when a specimen was collected in 1910 at Overland Corner, three hours north-east of Adelaide in South Australia's Riverland, across the Murray River from where Banrock Station is now situated.

No further sightings were recorded subsequently and by 1992, the spiny daisy was considered extinct in Australia. However, in 1999, a small population was discovered accidentally near Laura, in the Mid-North of South Australia, and further intensive surveys by South Australia's Department of Environment, Water and Natural Resources (DEWNR) and the Threatened Plant Action Group identified five further populations in the area.

Following the initial Mid-North find, the species became the subject of a concerted conservation effort by the Spiny Daisy Recovery Team under the guidance of DEWNR, and supported by Trees For Life, a South Australian non-government organisation (NGO) dedicated to revegetation and restoration of native

vegetation. The spiny daisy has been listed as Critically Endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act* (1999).

However, the survival of the spiny daisy hinged on the conservation of the six known natural populations located in unprotected areas on the road sides of the Mid North. As each of the natural populations were clonal, in effect only six genotypes (distinct individuals) of the species remained in the wild. The consequent risk of extinction was high, leading specialists to search for safe sites to reintroduce the species.

To safeguard against extinction, 11 conservation plantings have been established in the Mid-North, either to boost extant populations or as introductions to new sites. There have also been some plantings for educational purposes, including at the Botanic Gardens in Adelaide and in Canberra. Some of these plantings have been successful, while others have failed.

The historical locations of Lake Pamamaroo and Overland Corner are more arid than the sites of extant Mid North populations, suggesting that in these regions the species was probably confined to the banks or flood plains of the Murray–Darling river system.

In 2013, DEWNR conducted comprehensive surveys in the Riverland, which led to the Banrock Station Wetland Complex Ramsar site being selected as the site to reintroduce the species into its former range. Cuttings were collected from the six natural populations in the Mid North and propagated at the Banrock Station native plants nursery. Three suitable trial sites were chosen. The sites have been fenced to exclude herbivores until establishment, and the young plants will be irrigated in the early stages.



On 24 July 2014, the cuttings were planted by representatives of the organisations involved in recovering the spiny daisy from extinction. The re-introduction is a great example of positive partnerships between a conservation-minded private company, government agencies and an NGO dedicated to nature conservation. Depending on the success of these trial plantings, the plan is to undertake further plantings in subsequent years.

The translocation has been funded by the Banrock Station Environmental Trust.



*The site of the spiny daisy (Acanthocladium dockeri) reintroduction is protected from herbivores*  
(© Copyright, Christophe Tourenq, Banrock Station)



*The critically endangered spiny daisy (Acanthocladium dockeri) is being reintroduced at Banrock Station, South Australia*  
(© Copyright, Christophe Tourenq, Banrock Station)



*Banrock Station Wetland Complex Ramsar site in South Australia was chosen as the location for the reintroduction of the spine daisy (Acanthocladium dockeri)* (© Copyright, Christophe Tourenq, Banrock Station)



# A 'systems repair' approach to restoring the Ramsar wetlands of Bowling Green Bay in Queensland

Paul Duncanson, NQ Dry Tropics

The Bowling Green Bay Ramsar site (BGB) contains abundant and diverse aquatic ecosystems in the North Queensland dry tropics region, and sits adjacent to the Great Barrier Reef World Heritage Area.

The BGB wetlands also play an important role in capturing and sequestering diffuse source pollutants from intensive agriculture in the catchment, predominantly irrigated sugar cane production, before the waters enter the Great Barrier Reef lagoon. Since the expansion of agriculture and the construction of the Burdekin Falls Dam in the 1980s, coastal catchments feeding the BGB wetlands have undergone significant hydrological changes. What were once vast expanses of pristine ephemeral wetlands and waterways now act as permanently inundated conduits for bulk water supply and runoff from sugar cane farms. This has contributed to a decline in wetland condition, habitat fragmentation and significant loss of productive grazing land as weed chokes spread across the landscape due to constant inputs of eutrophic water.

Addressing this requires a 'systems repair' approach to build landscape resilience to deal with future pressures and ultimately improve the health of the Great Barrier Reef and Ramsar wetlands. The work complements existing initiatives to reduce diffuse agricultural pollutants (nutrients, pesticides and sediments) under the Australian Government's Reef Programme.

NQ Dry Tropics is working with local councils, water managers and farmers to modernise and operate more efficiently to tackle longstanding issues through the 'Restoring Burdekin Coastal Ecosystems for the Great Barrier Reef and Ramsar' project. The project aims to optimise and manipulate the water supply chain to limit the excessive volume of water entering the BGB Ramsar wetlands and strategically restore ecological function to priority sites whilst not impacting on the most productive sugar growing region of Australia.



*Wongaloo wetland is one of the many Ramsar wetlands within Bowling Green Bay that supports abundant populations of migratory bird species* (© Copyright, Paul Duncanson)



*An example of modernising water infrastructure to improve fish passage and reduce excessive water entering the Bowling Green Bay Ramsar Wetland and the Great Barrier Reef* (© Copyright, Paul Duncanson)

Recent studies by NQ Dry Tropics show vast expanses of weed chokes can be cleared by limiting freshwater inputs into the wetlands. This recreates a wetting-drying cycle that mimics natural wetland seasonality characteristic of the dry tropics region and restores aquatic connectivity for a suite of native fish species. To do this on a system wide scale requires innovative techniques, such as frequent monitoring of flows, automated gate telemetry, construction of fishways and monitoring of native plant and fish communities.

To date NQ Dry Tropics and project partners have revegetated 1.5 hectares of stream bank with over 2000 plants, and controlled 420 hectares of aquatic weeds using these techniques which are far more cost effective than more traditional methods of weed control (e.g. mechanical removal).

To find out more, contact  
NQ Dry Tropics on (07) 4724 3544  
or visit [www.nqdrytropics.com.au](http://www.nqdrytropics.com.au).

# Future proofing world-class wetlands in Victoria: A joint effort

Andrew Morrison (Port Phillip and Westernport Catchment Management Authority),  
Andrew Webster (Hobsons Bay City Council) and Bernie McCarrick (Parks Victoria)

## Working partnerships between state and local governments helps to protect the ecological values of wetlands in Port Phillip Bay.

Participation through the 'Ramsar Protection Program', delivered by Port Phillip and Westernport Catchment Management Authority, has helped consolidate the working relationship between Parks Victoria and Hobsons Bay City Council, whilst helping to future proof a unique stretch of shoreline along Port Phillip Bay.

The successful collaboration between two land managers is evident through the works undertaken by Hobsons Bay City Council at Truganina Park, a 25 hectare recreation and conservation park south-west of Melbourne. The park provides

wonderful panoramic views of Port Phillip Bay and Melbourne, and is a terrific vantage point to take in the complex series of ponds at Cheetham Wetlands, part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site

To the east of Truganina Park, Cheetham Wetland comprises 420 hectares of artificial lagoons and a natural lagoon, intertidal mudflats, a creek system, beaches and coastal dunes. Cheetham supports a variety of internationally significant shorebirds including the double-banded plover (*Charadrius bicinctus*), curlew sandpiper (*Calidris ferruginea*),



*Aerial view of Cheetham Wetlands bordered by Truganina Park, south west of Melbourne, Victoria*

(© Copyright, Port Phillip and Westernport Catchment Management Authority)





*Birds of a feather, flock together. Red-necked avocets (Recurvirostra novaehollandiae) at Cheetham Wetlands*

(© Copyright, Andrew Morrison)

red-necked stint (*Calidris ruficollis*), red-necked avocet (*Recurvirostra novaehollandiae*), sharp-tailed sandpiper (*Calidris acuminata*), banded stilt (*Cladorhynchus leucocephalus*) and Pacific golden plover (*Pluvialis fulva*).

Since 2011, more than nine-hundred metres of fencing has been erected, helping to protect over 110 hectares of primary foraging habitat for shorebirds at the Parks Victoria managed Cheetham Wetlands. The works have created mutual benefits for the agencies including positive outcomes in the protection of ecological values of these sensitive wetlands.

“Illegal access to Cheetham Wetlands was causing substantial impacts to vegetation health and condition. Furthermore, disturbance to resident and migratory shorebirds was noted on several occasions, with motorbikes and four-wheel drive vehicles using the mud-flat areas as a playground”, said Bernie McCarrick, ranger with Parks Victoria. Collaboration

between Hobsons Bay City Council and Parks Victoria has also extended to integrated pest plant and pest animal control programs.

The fencing work undertaken has significantly restricted public access to the site, helping to create an ideal setting for shorebirds, whilst allowing saltmarsh vegetation to re-establish in areas previously impacted by pedestrians and motorbikes. On-going monitoring of the wetland and maintenance of the fence will ensure these sensitive ecosystems are protected for future generations.

For more information, please visit the websites of Port Phillip and Westernport Catchment Management Authority ([www.ppwcm.vic.gov.au](http://www.ppwcm.vic.gov.au)), Parks Victoria ([www.parkweb.vic.gov.au](http://www.parkweb.vic.gov.au)) and Hobsons Bay City Council ([www.hobsonsbay.vic.gov.au](http://www.hobsonsbay.vic.gov.au)).



*Fencing work completed by Hobsons Bay City Council to manage public access into Cheetham Wetlands*

(© Copyright, Andrew Morrison)



*The ripple effect. A carefree Red-necked avocet (Recurvirostra novaehollandiae) plays at Cheetham Wetlands*  
(© Copyright, Andrew Morrison)



*Cheetham Wetlands are part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site*  
(© Copyright, Andrew Morrison)



*A juvenile Masked Lapwing (Vanellus miles) spotted at Cheetham Wetlands* (© Copyright, Andrew Morrison)

# Active water management is underway at the Hunter Estuary Wetlands Ramsar site

Hunter Wetlands Centre Australia

Following a long history of hydrological changes, wetlands in Newcastle are improving as a result of active management.



*Melaleuca Swamp at the Hunter Wetlands Centre Australia is a key breeding habitat for ibis and egrets* (© Copyright, Matthew Stow)

The natural hydrological regime of the Hunter Wetlands Centre component of the Hunter Estuary Wetlands Ramsar site has been altered significantly since the 1930s. Prior to 2008, the construction of causeways and filling of nearby land resulted in several ponds permanently holding water throughout the year.

One pond, known as Melaleuca Swamp, the site of annual ibis and egret breeding events, is under particular stress. Due to the extended periods of inundation, the health of the existing *Melaleuca quinquinervia* trees has declined, occasional algal blooms occur and the natural regeneration of the *Melaleuca quinquinervia* trees used for roosting has been disrupted. These changes further reduce the health and future breeding capacity of the swamp.

Over the past 3 years, there have been some improvements to the hydrological regime of Melaleuca Swamp. Some of the ponds have dried naturally, allowing for natural regeneration of *Bolboschoenus*, *Persicaria* and *Paspalum* species. An increase in wader and waterfowl populations has also been noted in the ponds, including breeding of several pairs of vulnerable species such as magpie geese (*Anseranas semipalmata*). It is expected that the health of these ponds will continue to improve and provide vital refuge and habitat for the 170 species of avifauna that frequent the site.

During 2012, saltwater intrusion into the Ironbark Marsh pond was recorded. This is believed to be an unintended consequence of the opening of the Ironbark Creek floodgates as part of the Hexham Swamp



Rehabilitation Project undertaken by the Hunter Central Rivers Catchment Management Authority following an extensive Environmental Impact Statement. Although Ironbark Marsh was historically salt marsh, construction of the dump and council drainage channel in 1975 altered the flow of the creek.

When the Hunter Wetlands Centre component of the Hunter Estuary Wetlands Ramsar site was designated as a Ramsar Wetland of International Importance in 2002, the system had begun to change to freshwater. The opening of the floodgates in 2008 and 2013 reintroduced salt water back into the system and measures put in place to prevent saltwater intrusion into

the wetlands malfunctioned. Further intrusion into other freshwater ponds on the Hunter Wetlands site has been prevented with the installation of flow control gates. Hunter Wetlands Centre management are working with the New South Wales Office of Environment and Heritage and Hunter Local Land Service to develop appropriate long term management strategies for the site.

For further information on the wetlands at Hunter Wetlands Centre Australia, please visit: [www.wetlands.org.au](http://www.wetlands.org.au).



*Salt water intrusion into Ironbark Marsh resulted in freshwater vegetation dieback and recruitment of salt marsh species*  
(© Copyright, Matthew Stow)

# Puddles of paradise support threatened species in Gunbower Forest Ramsar site

Tessa Grieves, North Central Catchment Management Authority

Nationally threatened species are settling in well in what can be described as no more than a trackside puddle in the Gunbower Forest Ramsar site in Victoria.

The North Central Catchment Management Authority's (CMA) Gunbower Forest Protection Project team has been working with local ecologists to reintroduce threatened wetland flora species back into the forest.

Stiff groundsel (*Sencio behrianus*) and ridged water-milfoil (*Myriophyllum porcatum*) are both listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Neither species are particularly eye catching, but both are a key part of enhancing biodiversity within the Gunbower Forest which has suffered significant flora declines since the arrival of Europeans.

Historic records indicate that both species were once far more widespread throughout the Murray–Darling Basin. Interestingly though, little is known about the history and distribution of stiff groundsel. The species was thought to be extinct, having not been seen since the late 1880s, until it was discovered in the small rural district of Corop, Victoria in 1991 (Nevill, G.R. and Camilleri, M., 2010).

The decline of these species throughout the Gunbower Forest, and elsewhere in Victoria, is largely due to historic wetland drainage, habitat fragmentation, grazing pressure, river regulation and unseasonal flooding regimes.

While the hydrological regime and fragmentation issues are harder to overcome, the project team has been able to undertake significant threat abatement works to reduce the encroachment of both terrestrial and aquatic weeds which compete with these fragile natives.

Choosing appropriate locations to reintroduce these wonderful little plants was surprisingly simple despite each species having quite varied habitat requirements. Being an aquatic plant, ridged water-milfoil requires seasonally inundated habitats while the stiff groundsel prefers the higher fringes of ephemeral wetlands.

Trackside and forest gilgai type depressions were identified as suitable planting sites, supported by recent inundation from the release of the largest environmental watering event into the Gunbower Forest as part of The Living Murray initiative.

While ground conditions were ideal as a result of the water availability, the plants required further protection from the abundance of wildlife present in the forest. Strong wire guards were erected to keep out foraging waterbirds, emus (*Dromaius novaehollandiae*) and wallabies. All the 'puddles' were water-quality tested, GPS referenced and several have had follow up watering to increase survival rates.

Ecologist, Damien Cook (Rakali Ecological Consulting), who propagated and assisted in the reintroduction plantings has reported an excellent survival and response rate from the trial. All five sites were teeming with life; amongst the frogs and insects, the ridged water-milfoil had begun flowering and most astonishingly, two EPBC Act listed species were observed cohabitating in one hotspot of a puddle.

Funding for this project is provided by the Australian Government and delivered through the North Central Catchment Management Authority's Gunbower Forest Key Asset Protection Project.

## References

Nevill, G.R. and Camilleri, M. 2010. National Recovery Plan for the Stiff *Groundsel Senecio behrianus*. Department of Sustainability and Environment, Victoria.



*Ecologist Damien Cook planting and protecting threatened species in Gunbower Forest Ramsar site, Victoria*

(© Copyright, Adrian Martins)



# Lake Mealup on the road to recovery

Western Australian Department of Parks and Wildlife

## Restoration works are being undertaken to protect the ecological values of Lake Mealup, part of the Peel-Yalgorup System Ramsar site on the Swan Coastal Plain in Western Australia.

Lake Mealup is recognised under the Ramsar Convention as internationally important for migratory waterbirds. Declining rainfall since the 1970s and modified drainage has led to the lake drying out. Exposure of the sediments has caused extreme acidification and loss of habitat for waterbirds. In response, a collaborative effort between Government and community groups has started to restore the Lake and protect the future of the Lakes ecological values.

Changes in the lake's natural hydrology have resulted in the wetland system becoming drier, exposing sulfidic sediments and allowing the invasion of the bulrush (*Typha orientalis*). The resulting decline in ecological health of the lake (the lake recorded a pH of 2.69 in November 2009) exceeded the limits of acceptable change identified within the Ecological Character Description for the Peel-Yalgorup System Ramsar Site.

The Lake Mealup Recovery Program was developed to respond to this decline. The recovery program is a collaboration between the State Government agencies of Parks and Wildlife and the Department of Water, the Lake Mealup Preservation Society, the Peel-Harvey Catchment Council and the South West Catchment Council. Community groups, landholders, Aboriginal representatives and state government agencies are working together to restore the lake.

The Lake Mealup Recovery Program's greatest asset has been its range of stakeholders. There has been tremendous support from the community for the planning process. The recovery program follows an adaptive management approach which identifies

targets for ecological health and monitoring triggers for management action. The key component of the recovery program is the diversion weir which allows controlled diversion of flow from the Mealup Main Drain into Lake Mealup to maintain water levels and reduce acidification.

Prior to commissioning the weir in June 2012, over 43 hectares of bulrush were cut, with the crushed plants providing the necessary carbon for biogeochemical processes to neutralise acidity. On returning surface water flow to the system, the results were almost immediate with pH returning to within normal range after only two months. Since then, the abundance of water birds has increased from less than 100 before the recovery program to over 2000 birds with 43 species recorded, including swans, ducks, grebes, darters, cormorants, egrets and spoonbills. New species sighted in 2014 include the trans-equatorial migrants bar-tailed godwit (*Limosa lapponica*), curlew sandpiper (*Calidris ferruginea*), marsh sandpiper (*Tringa stagnatilis*), wood sandpiper (*Tringa glareola*), sharp-tailed sandpiper (*Calidris acuminata*) and common greenshank (*Tringa nebularia*).

The ultimate aim for Lake Mealup is for the site to be managed as a wetland habitat for water birds. Members of the Technical Advisory Group for the project will continue to monitor the condition of the lake and use this information to manage water levels to optimise lake health.

For more information, please contact Heidi Bucktin (08 9303 7757) from the Western Australian Department of Parks and Wildlife.



*Aerial image of Lake Mealup, part of the Peel-Yalgorup System Ramsar site in Western Australia*

(© Copyright, Ross Rose)



*A diversion weir will allow water to be redirected into Lake Mealup to assist with restoration activities*

(© Copyright, Heidi Bucktin)

# Environmental flows aid the recovery of Gunbower Forest Ramsar site

Anna Chatfield and Kathryn Stanislawski, North Central Catchment Management Authority

## Life-giving environmental water aids continued recovery of a forest in the Murray–Darling Basin.

In 2014, Gunbower Forest was allocated 60 gigalitres of environmental water to enable it to continue its recovery from the Millennium drought. Environmental water was delivered into the forest using regulators and a one kilometre channel, recently constructed as part of The Living Murray initiative.

The millennium drought was broken in 2010 by extensive natural flooding which inundated over 9000 hectares of the forest. The Gunbower Forest also received natural flooding in 2011 and 2012, resulting in the forest receiving three consecutive years of flooding.

Monitoring the response of the forest to the natural flooding in 2011 and 2012 found some unexpected results. The natural flooding was long and extended into the summer months. This created deep and dark conditions within the wetlands, and prevented some wetland plants from thriving.

Following the floods, no environmental water was delivered to Gunbower Forest in 2013 to allow a drying event. The drying phase has been important for reducing carp numbers in the forest wetlands and preparing the forest for the first operation of the Hipwell Road Channel.

After a long hot summer, little water remained in the forest with permanent wetlands receding to either small residual pools or completely drying.

Delivery of environmental water into the forest commenced in late May 2014, filling flood runners, creeks and wetlands in the forest. As these areas filled, water has spread out across the forest floor under the river red gums (*Eucalyptus camaldulensis*). Over 3800 hectares of the forest was flooded.

North Central Catchment Management Authority (CMA) staff and a team of fish and vegetation ecologists monitored the forest's response to the environmental watering. Aquatic plants began to germinate within weeks of the water being delivered. Large patches of nardoo (*Marsilea angustifolia*) and hundreds of water ribbons (*Cyanogeton procerum*) flowered over the spring months providing nesting material for waterbirds, such as swans and ducks.

As water began to drain from the forest, native fish including golden perch (*Macquaria ambigua*) and Murray cod (*Maccullochella peelii*) were found making the most of the nutrient rich water which contained thousands of invertebrates for them to eat.

Funding for this project is provided by The Living Murray initiative and delivered through the North Central CMA's Gunbower Forest Flooding for Life Project. The Living Murray is a joint initiative funded by the New South Wales, Victorian, South Australian, Australian Capital Territory and Commonwealth governments, coordinated by the Murray–Darling Basin Authority.





*North Central Catchment Management Authority Project Manager, Anna Chatfield, visits the Hipwell Road offtake regulator that helps to deliver environmental water to Gunbower Forest in Victoria* (© Copyright, Kathryn Stanislawski)



*River red gums (Eucalyptus camaldulensis) surrounding Little Gunbower Creek enjoying environmental water in September 2014* (© Copyright, Anna Chatfield)

# Aquatic habitat improves during low flow years at a South Australian Ramsar site

South Australian Department of Environment, Water and Natural Resources

## New infrastructure at the Bool and Hacks Lagoons Ramsar site in South Australia is helping to improve the hydrological regime and aquatic habitat at the wetland.

The 3220 hectare Bool and Hacks Lagoons Ramsar site is located in South Australia's south-east, and was designated as a Ramsar site in 1985. The site consists of a seasonal fresh water lake and wetland area, and supports a mosaic of aquatic and semi-aquatic vegetation communities that provide habitat for a diverse range of waterbirds and nationally threatened fish, reptiles and frogs. Bool Lagoon is connected to Hacks Lagoon by four man-made channels and is managed as one unit. The water levels within the Lagoons are maintained by a regulating structure on the western side of Bool Lagoon.

A majority of the site's surface water comes from Mosquito Creek, and whilst flows in the creek fluctuate seasonally, base flow was maintained all year until 2002 when the creek ceased to flow for the first time since gauging commenced in 1971. Since this time, flows have been limited with the creek continuing to dry annually for extended periods. This is due to a number of factors including the drought conditions experienced in 2006–2009, changes in catchment landuse including irrigation and forestry, and possibly climate change impacts.

In 2014, Hacks Lagoon received less than 1 gigalitre of water. Despite this low inflow, the lagoon filled with water and is still providing aquatic habitat for large numbers of waterbirds, fish and frogs.

In February 2013, a more natural water regime was reinstated so that in dry, low flow years such as 2014, Hacks Lagoon can hold water for longer, and at a greater depth allowing fish, frogs and birds to complete their life cycles.

Bool Lagoon requires approximately 30 gigalitres of water to fill, however from 1993–2012 there have only been two large inflow events during which the Lagoons have filled to provide the habitat necessary for the successful breeding of birds and threatened frog and fish species. In years of low inflows, water that entered Hacks Lagoon flowed through the channels and into Bool Lagoon where it dissipated across the main basin. As a result, it failed to provide adequate water depth, period of inundation or aquatic habitat in either Bool or Hacks Lagoons.

To maintain more water in Hacks Lagoon, the height of the sills in the channels that connect Bool Lagoon from Hacks Lagoon were increased using funding from the Australian Government. Now, water fills Hacks Lagoon before flowing through into Bool Lagoon so that in low flow years aquatic habitat will still be provided.

For further information on the Bool and Hacks Lagoons Ramsar site, please visit: [www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=26#](http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=26#).





*Ibis nests at the Bool and Hacks Lagoons Ramsar site in South Australia* (© Copyright, Abigail Goodman)



*Straw-necked ibis (Threskiornis spinicollis) benefit from improved hydrological conditions at the Bool and Hacks Lagoons Ramsar site in South Australia* (© Copyright, Abigail Goodman)