State of the catchments 2010

Wetlands

Murrumbidgee region

State Plan target

By 2015 there is an improvement in the condition of important wetlands and the extent of those wetlands is maintained.

Background

The Murrumbidgee region covers approximately 84,000 km^2 of semi-arid New South Wales. The region contains diverse landscapes such as the alpine areas, slopes and plains, and a number of wetland types such as upland swamps and lakes, inland billabongs, inland rainfall swamps and inland floodplains.

Overall, wetlands in the Murrumbidgee region are in very poor condition. The greatest pressure on wetlands in this region is from catchment and habitat disturbance caused by feral animals, grazing, high vegetation and lack of protection.

A detailed technical report describes the methods used to derive the information contained in this report. At the time of publication of the *State of the catchments (SOC) 2010* reports, the technical reports were being prepared for public release. When complete, they will be available on the DECCW website: www.environment.nsw.gov.au/publications/reporting.htm.

Note: All data on natural resource condition, pressures and management activity included in this SOC report, as well as the technical report, was collected up to January 2009.

Map of the catchment

Assessment

Specific sites have been mapped for this report as NSW wetlands are neither comprehensively nor consistently mapped. The state target specifies that only 'important' wetlands be assessed; the sites reported on in this document are therefore internationally, nationally and regionally important but may not be representative of all wetlands in the region.

The state target reports only on freshwater wetlands in NSW and does not include riverine, estuarine or tidal wetlands.

Condition

Wetland 'extent' refers to the condition of the inundated area and the vegetation that depends on it. A state-wide methodology is currently being developed by DECCW to determine the minimum and maximum extent of each wetland. Until this method has been developed and consistent mapping is carried out for all regions, the extent of NSW wetlands cannot be compared or comprehensively reported on.

Indicators of condition

In general, there is a lack of available data on the condition of NSW wetlands and very few procedures or standards for collecting and analysing such data.

For the purposes of this report, 'indicators of condition' have been combined (without weighting) to produce an overall 'condition rating' for each wetland (see Table 1). This provides an overview of the most significant wetlands within the region and may prove useful when devising a formal methodology to assess wetlands in NSW. The value of this condition rating depends to a very large

extent on the data on individual indicators; in many cases the 'indicator of condition' is based on very limited data, in some cases on pest species alone, so the overall indicator should be regarded with some caution.

Measured in the fringing zone and/or wetland, the indicators of condition assessed for the 28 most significant wetlands in the Murrumbidgee region were:

- **biological condition** – the response of the wetland flora (eg aquatic and fringing vegetation) and fauna (eg birds, fish and invertebrates) to pressures on the ecosystem. It can be a measurement of the presence, abundance or health of these plants and animals or a combination of both; there is currently not much data available for many of these indicators and additional data will need to be collected in future
- **pest species** – the ratio of native to introduced species of both flora and fauna
- **water quality** – the condition of the water in the wetland. Water quality takes into account pH, salinity and turbidity; data can be very difficult to analyse as results can be highly variable. Analysis of a wetland's water quality is important as the water supports biota and ecological processes within the ecosystem
- **soil condition** – the physical attributes of the wetland including pH, salinity, soil moisture, erosion and modifications such as channelling works. Wetland soils contain nutrients that form the base of the food chain, and store seeds and eggs of wetland animals and plants. Soils vary according to wetland type.

Table 1 Indicators of condition and overall condition rating for wetlands in the Murrumbidgee region

Wetlands	Condition	Trend	Data confidence	Indicators				Extent (hectares)	Trend
				Biological condition	Pest species	Water quality	Soil condition		
Overall Murrumbidgee wetlands		?	L						
Overall NSW wetlands									
Black Swamp Inland floodplain swamp		?	L					112.19	?
Coopers Swamp 2 Inland floodplain swamp		?	L					106.3	?
Dudal Corner Swamp Inland rainfall swamp		?	L					1713.95	?

Fivebough Swamp Inland rainfall swamp		?	L					261.37	?
Lake George Upland freshwater lake		?	L					14630.67	?
Lowbidgee Floodplain Inland floodplain swamp		?	L					112569.63	?
Bulgari Inland billabong		?	L					8.54	?
Currawananna Lagoon Inland billabong								21.54	?
McKennas Lagoon Inland billabong								26.73	?
Lower Mirrool Creek Floodplain Inland floodplain swamp		?	L					132.29	?
Micalong Swamp Upland bog and fen		?	L					94.81	?
Tuckerbil Swamp Inland rainfall swamp		?	L					24.48	?
Big Badja Swamp Upland bog and fen		?	L					91.25	?
Coopers Swamp Upland bog and fen		?	L					14.83	?
Tomney's Plain Upland bog and fen		?	L					107.31	?
Yaouk Swamp Upland bog and fen		?	L					145.39	?
Killmacoola Lake Upland freshwater lake		?	L					24.86	?
Long Lake Upland freshwater lake		?	L					11.46	?

O'Neils Lake Upland freshwater lake		?	L					21.78	?
Muddah Lake Upland freshwater lake		?	L					18.31	?
Darlington Lagoon Inland billabong		?	L					14.56	?
Coononcoocabil Lagoon Inland billabong		?	L					65.96	?
Mundowey Lagoon Inland billabong		?	L					7.25	?
Riverslie Lagoon Inland billabong		?	L					7.64	?
Sheepwash Lagoon Inland billabong		?	L					2.61	?
Kelvin Grove Lagoon Inland billabong		?	L					3.04	?
Flowerdale Lagoon Inland billabong		?	L					11.64	?
Gobbagombalin Lagoon Inland billabong		?	L					8.86	?

Condition

- Very good
- Good
- Fair
- Poor
- Very poor
- No data

Trend

- ↑ Improving
- ↔ No change
- ↓ Declining
- ? Unknown

Data confidence

- H High
- M Medium
- L Low

Indicators of condition vary between wetland types; some indicators of condition do not apply to certain wetland types or may be scored differently between types. Various data is not available due to reasons such as a lack of raw data, lack of information on how to score certain indicators and no long-term datasets to appropriately score the indicator.

Condition indicators, such as invertebrates and vegetation, would be appropriate if data and standards were available. These will continue to be developed for future reporting cycles.

Condition variables

Many variables were taken into account when calculating condition scores. Where relevant, the following variables were considered during analysis of the Murrumbidgee region wetlands:

- **biological condition** – tree health
- **pest species** – ratio of native to introduced plants, ratio of native to introduced animals
- **water quality** – total nitrogen load (kg/ha/yr), total phosphorus load (kg/ha/yr), total nitrogen (µg/L), total phosphorus (µg/L), number of algal blooms, turbidity (NTU), ambient pH, salinity (EC)
- **soil condition** – ambient pH.

For detailed information on which variables were used to calculate the condition scores, and how they were scored, aggregated and weighted, please see the supporting technical report.

Pressures

There are a variety of 'pressures' or disturbances that adversely impact on wetlands and ultimately affect the overall condition rating. As was the case with condition assessment, a methodology has not yet been formulated to determine the pressures on individual wetlands across all NSW.

Indicators of pressure

For the purposes of this report, the following 'indicators of pressure' have been combined (without weighting) to produce an overall 'pressure rating' (see Table 2).

Measured in the fringing zone, wetland, and/or hydrological catchment, the indicators of pressure assessed for the 28 most significant wetlands were:

- **catchment disturbance** – modifications or changes to the catchment structure or processes that affect the wetland. Significant catchment disturbances affecting NSW wetlands include urbanisation, agriculture, vegetation clearing, infrastructure and fire
- **hydrological disturbance** – the levels of nutrients entering a wetland, water and soil chemistry, vegetation patterns, the biota present and the wetland's productivity. Drainage, damming, extraction and river regulation have greatly altered the hydrologic dynamics of many NSW wetlands
- **habitat disturbance** – both the direct removal of wetland habitat and activities that modify, damage or disturb wetland habitat areas. Disturbance to a habitat may include construction work, urban development, clearing for agriculture, recreational uses and water regulation.

Table 2 Indicators of pressure and overall pressure rating for wetlands in the Murrumbidgee region

Wetlands	Pressure	Trend	Data confidence	Indicators		
				Catchment disturbance	Hydrological disturbance	Habitat disturbance
Overall Murrumbidgee wetlands		?	L			
Overall NSW wetlands						
Black Swamp Inland floodplain swamp		?	L			
Coopers Swamp Inland floodplain swamp		?	L			
Dudal Corner Swamp Inland rainfall swamp		?	L			
Fivebough Swamp Inland rainfall swamp		?	L			
Lake George Upland freshwater lake		?	L			
Lowbidgee Floodplain Inland floodplain swamp		?	L			
Bulgari Inland billabong		?	L			
Currawananna Lagoon Inland billabong		?	L			
McKennas Lagoon Inland billabong		?	L			
Lower Mirrool Creek Floodplain Inland floodplain swamp		?	L			
Micalong Swamp Upland bog and fen		?	L			
Tuckerbil Swamp Inland rainfall swamp		?	L			
Big Badja Swamp Upland bog and fen		?	L			

Coopers Swamp Upland bog and fen		?	L			
Tomney's Plain Upland bog and fen		?	L			
Yaouk Swamp Upland bog and fen		?	L			
Killmacoola Lake Upland freshwater lake		?	L			
Long Lake Upland freshwater lake		?	L			
O'Neils Lake Upland freshwater lake		?	L			
Muddah Lake Upland freshwater lake		?	L			
Darlington Lagoon Inland billabong		?	L			
Coononcoocabil Lagoon Inland billabong		?	L			
Mundowey Lagoon Inland billabong		?	L			
Riverslie Lagoon Inland billabong		?	L			
Sheepwash Lagoon Inland billabong		?	L			
Kelvin Grove Lagoon Inland billabong		?	L			
Flowerdale Lagoon Inland billabong		?	L			
Gobbagombalin Lagoon Inland billabong		?	L			

Pressure

1	2	3	4	5
very high	high	moderate	low	very low

No data

Trend

↑	Increasing
↔	No change
↓	Decreasing
?	Unknown

Confidence

H	High
M	Medium
L	Low

As was the case with indicators of condition, some indicators of pressure do not apply to certain wetland types or may be scored differently between types. Likewise, various data is not available due to reasons such as a lack of raw data, lack of information on how to score certain indicators and no long-term datasets to appropriately score the indicator.

Pressure variables

Many variables were taken into account when calculating pressure scores. Where relevant, the following variables were considered during analysis of the 28 most significant wetlands in the Murrumbidgee region:

- **catchment disturbance** – catchment cleared (%), wetland adjoining urban areas (%), infrastructure, presence of point sources
- **hydrological disturbance** – number and type of impoundments, river regulation, farm dam density, number of groundwater bores, density of irrigation channels
- **habitat disturbance** – recreational use (eg camping, boat ramps, parks), lakebed cropping, grazing, pugging, travelling stock routes, roads crossing and/or adjoining the wetland, wetland in a protected area (%), barriers without fish passage, presence of feral animals.

Management activity

Addressing the wetlands target in the Murrumbidgee region involves implementing a number of policies and programs at both a state and regional level, which will result in the improved condition of Murrumbidgee and other NSW wetlands.

State level

The wetlands target is being addressed at the state level in numerous ways:

Policy

- The draft NSW Wetlands Policy provides clear and consistent principles of management for the improvement and protection of the state's wetlands. It also aims to increase the capacity for a coordinated, cross-government approach to wetland conservation.

Protection and rehabilitation

- The NSW Wetland Recovery Program (WRP), NSW Rivers Environmental Restoration Program (RERP) and NSW Riverbank Project aim to deliver long-term and permanent benefits for ecologically significant wetlands. These programs achieve such benefits through water efficiency projects, water buy-back and projects to improve wetland management. The WRP and RERP Programs are joint initiatives with the Australian Government
- There is continuous protection and conservation of wetlands under conservation agreements and on public reserves, in wildlife refuges and on various other private and public lands
- The 2008–2018 NSW National Park Establishment Plan lists wetlands as a priority
- NSW Riverbank, RERP and WRP programs have purchased 9,883 ML of entitlements in the Murrumbidgee Valley which will be used to enhance wetland and river health.

Monitoring, evaluation and reporting

- The NSW Integrated Monitoring of Environmental Flows measures changes in environmental flows and ecosystem responses and provides information to improve wetland conditions.

Regional level

At the regional level, the Murrumbidgee Catchment Management Authority undertakes various activities to achieve the state target. Specific examples include the following:

- area of wetland native vegetation enhanced/rehabilitated across the region: 161 ha
- development of a decision-support system for environmental water management
- development of a natural resources management plan for the Lower Murrumbidgee floodplain
- Murrumbidgee Irrigation has restored 1650 ha of Barren Box swamp.

Further reading

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