



LIKELY CHANGE IN ECOLOGICAL CHARACTER OF THE MACQUARIE MARSHES RAMSAR SITE - STATEMENT OF REASONS

The *National Guidance on Notifying Change in Ecological Character of Australian Ramsar Wetlands (Article 3.2)* notes that a statement of reasons for any notification will be posted on the Department of the Environment, Water, Heritage and the Arts (DEWHA) website under the link to the relevant Ramsar site, together with appropriate reference to any related published supporting evidence that has informed the assessment (section 3.2 of the *National Guidance* refers).

This statement of reasons is intended to provide information to interested parties as to the detail of the 'likely' change notified with respect to the Macquarie Marshes Ramsar site. The statement is also important in informing the development of the Response Strategy for the site (section 3.5 of the *National Guidance* refers).

Article 3.2 of the Ramsar Convention

Article 3.2 of the Ramsar Convention requires that:

“Each Contracting Party shall arrange to be informed *at the earliest possible time* if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference. *Information on such changes shall be passed without delay* to the organization or government responsible for the continuing bureau duties [i.e., the Ramsar Secretariat] specified in Article 8” (Ramsar Convention 1987, Article 3.2).

Ecological Character

The ninth Conference of the Contracting Parties to the Ramsar Convention (CoP9 2005), established the following revised definition of ecological character:

“Ecological character is the combination of the ecosystem components, processes and benefits¹/services that characterise the wetland at a given point in time.” (Resolution IX.1, Annex A).

The same resolution established the following revised definition of ‘change in ecological character’:

“For the purposes of implementation of Article 3.2, change in ecological character is the human-induced adverse alteration of *any ecosystem component*, process, and/or ecosystem benefit/service.”

The Macquarie Marshes Ramsar Site

The Macquarie Marshes Ramsar site was designated on the List of Wetlands of International Importance in August 1986, with a further extension in January 2000 to

¹ Within this context, ecosystem benefits are defined in accordance with the MA definition of ecosystem services as “the benefits that people receive from ecosystems”.

add the privately owned and managed 'Wilgara' wetland. The Macquarie Marshes Ramsar site currently consists of the northern and southern sections of the Macquarie Marshes Nature Reserve (18,143 ha) and the Wilgara wetland (583 ha).

The Macquarie Marshes Ramsar site comprises a complex of braided swamps, lagoons, channels and gilgaied floodplain inundated by flooding from the lower Macquarie and its distributary streams. The site incorporates extensive areas of reed swamp, river red gum woodland, and water couch grassland which provide important habitat for many species of flora and fauna, particularly the large numbers of colonial waterbirds which breed here as well as many migratory species.

Background

An assessment of available evidence of change or likely change in ecological character of the Macquarie Marshes Ramsar Site was undertaken by DEWHA. This assessment was conducted in consultation with the NSW Department of the Environment, Climate Change and Water (NSW DECCW) and the owners of Wilgara.

Findings on an assessment of evidence of change or likely change in ecological character

Changes in flow regime

1. Changes in flows into the Macquarie Marsh have been extensively studied over the past 15 years. Kingsford and Thomas (1995) reported that the flow between Dubbo and Warren and between Warren and Oxley Gauging Station has fallen markedly in the period 1944 to 1994. For example between 1944 and 1953 volume at Oxley was 51per cent of the flow through Dubbo. In the 1984 to 1993 period volume at Oxley was 21per cent of the flow through Dubbo. Kingsford and Thomas calculated that there was no significant difference in rainfall between the two decades.
2. Inundation mapping of the Macquarie Marshes over the period 1979 to 2006 demonstrates a significant reduction in the frequency, extent and duration of low, medium and high inundation events.
3. The area receiving high inundation frequency in the Macquarie Marshes has declined during this time by 57per cent in the northern section of the Macquarie Marshes Nature Reserve and by 95per cent in the southern section of the Macquarie Marshes Nature Reserve.

Change in extent and condition of wetland vegetation communities in the southern section of the Macquarie Marshes Nature Reserve (MMNR)

4. In 1981 large stands of reed of approximately 2000 ha were mapped in the South Marsh. In 1991 a very similar area of reed bed was again mapped. Further mapping found that change since 1991 in the southern section of the MMNR included a 95per cent reduction in the area of common reed from 1207 ha to 67 ha.
5. Water couch forms extensive grasslands in the Marshes as well as being an important understorey plant in woodland areas. Vegetation mapping in 2008 found no water couch remaining in the southern section of the MMNR, revealing a loss of 220 ha since 1991.

6. Authors of vegetation mapping in the southern section of the MMNR found 'catastrophic' change since 1991 with the loss of 95per cent of semi-permanent wetland vegetation (reeds, cumbungi and water couch), a decline in the condition of river red gum, coolibah and black box communities and a 100per cent loss of grassland communities. There had been some increases in the area of black box in the southern section of the MMNR since 1991 but the condition of these woodlands had changed with most now classified as black box woodland/chenopod shrubland. Chenopod shrubland now covers 80per cent of the southern section of the MMNR.

Change in extent and condition of wetland vegetation communities in the northern section of the Macquarie Marshes Nature Reserve (MMNR)

7. The North Marsh supports the most extensive area of river red gum forest and woodlands in the Macquarie Marshes. Recent vegetation mapping in the northern section of the MMNR has shown the area of river red gum forest with wetland understorey has reduced in area by 22per cent i.e. of the 1860 ha mapped in 1991, 1486 ha remained in 2008. The area of river red gum woodland remained relatively stable over this time however the condition of this community has declined both in over-storey condition (tree health) and understorey composition (species richness and type).
8. A 2008 survey of tree health and demographics in the Macquarie Marshes found that 73per cent of sites surveyed within the northern section of the MMNR were under extreme water stress and only 8per cent of sites were showing a demographic profile which indicated a "fair" regenerative potential - none were found to be "good". The composition of the understorey of river red gum woodland is now dominated by chenopod shrub species more indicative of dryland communities. In 1991 there were 4200 ha of river red gum woodland mapped. In 2008 this had increased slightly through recruitment and all of this area had an understorey predominately comprised of chenopod shrubs. The chenopod shrubs have replaced the grass and forb species formerly described in 1981 as the understorey dominants in this community.
9. The death of more than 30per cent of river red gums in the woodlands of the North Marsh has been attributed to lack of flooding. River red gums in the Marshes need floods every 1-2 years. In 2004, trees that received a flood in 2000 but were not flooded in 2003 were under severe stress or dead. Since 2001, the Marshes have received less than 25per cent of their environmental water allocation which means less than 5000 ha of the Marshes has received a flood every 1-2 years. The mapped area of river red gum forest and woodland in the Marshes was 40,000 ha in 1991, a large proportion of this in the North Marsh. In 2008 it was likely that as much as 75per cent of these woodlands had not received adequate flooding for their survival and were in poor condition.
10. In the northern section of the MMNR there has been a 33per cent reduction in the area of waterbird habitat provided by semi permanent wetland vegetation that is common reed, cumbungi and water couch marsh. In 1991 a total of 3314 ha was mapped, in 2008 only 2228 ha remained and much of this was in poor condition. Individually, common reed has reduced in area by 4per cent, cumbungi by 75per cent (259 ha mapped in 1991, 58 ha in 2008) and water couch marsh by 87per cent (843 ha in 1991 to 113 ha in 2008). Declining condition of wetland vegetation is the most significant ecological issue for the northern section of the MMNR.

Changes in ecological character of Wilgara wetland

11. The Draft Macquarie Marshes Adaptive Environmental Management Plan (AEMP) notes the following with regard to the Wilgara component of the Ramsar site (p 30):

- vegetation mapping has shown little change in the spatial extent of the vegetation communities between 1991 and 2008, but the condition of some types has declined.
- water couch marsh now has dryland chenopod shrubs occurring as a secondary species within the community.
- surveys of tree health in the river red gum community of Wilgara showed a range from “fair” to “stressed” and all were considered “vulnerable” in terms of their regenerative potential. The very largest (and therefore probably the oldest) trees tended to be relatively healthy however some large trees and most of the younger ones showed signs of stress. The understorey at these sites included water couch and lignum, indicating that Wilgara has not progressed as far towards the dryland state seen in some other parts of the Marshes.

Changes in colonial waterbird breeding

12. In the 15 year period between 1986 and 2001, colonially nesting species bred in 10 years at 14 sites throughout the Marshes. By 2008 several of the known breeding locations were considered in poor condition due to both lack of water and grazing pressure. There has been only one colonially nesting waterbird breeding event in the Macquarie Marshes since 2001.
13. Colonial nesting waterbirds have been recorded breeding in five locations in the northern section of the MMNR. In 2000, in which the last large flood and breeding event occurred, three locations were used. The two locations not used were Hunt’s Woodland, a river red gum bird breeding site that has not been used since 1993 and Loudon’s Lagoon, a common reed and marsh club-rush site that has not been used since 1998. The vegetation in Hunt’s woodland is stressed and approximately 30per cent of trees are dead and the vegetation in Loudon’s Lagoon is considered in poor condition probably due to lack of water, a reedbed fire and the impact of high densities of pigs, goats and kangaroos.
14. A small egret colony nested successfully in river red gum forest on Bora Channel in 2008.

Reasons for decision

15. On assessment of the available evidence, the Administrative Authority for the Ramsar Convention in Australia (the Australian Government Department of the Environment, Water, Heritage and the Arts) was satisfied that human induced changes to the flow regime of the Macquarie Marshes as a result of river regulation are adverse to the ecological character of the Macquarie Marshes Ramsar site. In particular, the decline in the health and extent of key wetland vegetation communities for which the site was originally included in the List of Wetlands of International Importance suggest a likely change in the ecological character of the site.

16. A decision to notify regarding an actual adverse change (the notification is of 'likely change') in the ecological character of the site has been deferred until completion and endorsement of the Ecological Character Description of the Macquarie Marshes Nature Reserve component of the Macquarie Marshes Ramsar that is currently being prepared by NSW DECCW.

Evidence or other material on which findings were based

5 June 2009. Site inspection of the Macquarie Marshes Nature Reserve and 'Wilgara' Wetland, including interviews with site managers.

CSIRO. 2008. *Water Availability in the Macquarie-Castlereagh: A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project.*

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Kingsford R *et al.* 2007. *Draft Ecological Character Description of the NSW Nature Reserve Components of the Macquarie Marshes Ramsar site* (unpublished).

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MDBC. 2008. *Sustainable Rivers Audit SRA Report 1: A report on the ecological health of rivers in the Murray-Darling Basin, 2004–2007.*

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Ramsar Convention. 1987. *Convention on Wetlands of International Importance especially as Waterfowl Habitat.*

Ramsar Convention. 2005. *Resolution IX.1 Annex A: A Conceptual Framework for the wise use of wetlands and the maintenance of their ecological character.*

Thomas R *et al.* 2008. *Abstract: Ecosystem Response Modelling Conference in the Murray Darling Basin.*

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