

Wetland Management in the Murray Darling Drainage Basin

By the British Geographer

Place Context

The Murray-Darling basin is a vast drainage basin, 1,061,469 km² in size located in the south east of Australia. It is the combined catchment of the Murray River and the Darling River and occupies the four states of Queensland, New South Wales, South Australia and Victoria. These two rivers are generally slow flowing and carry a relatively large amount of water in Australian terms. The Murray-Darling supports an enormous number of wetland environments, highlighted in the map below.

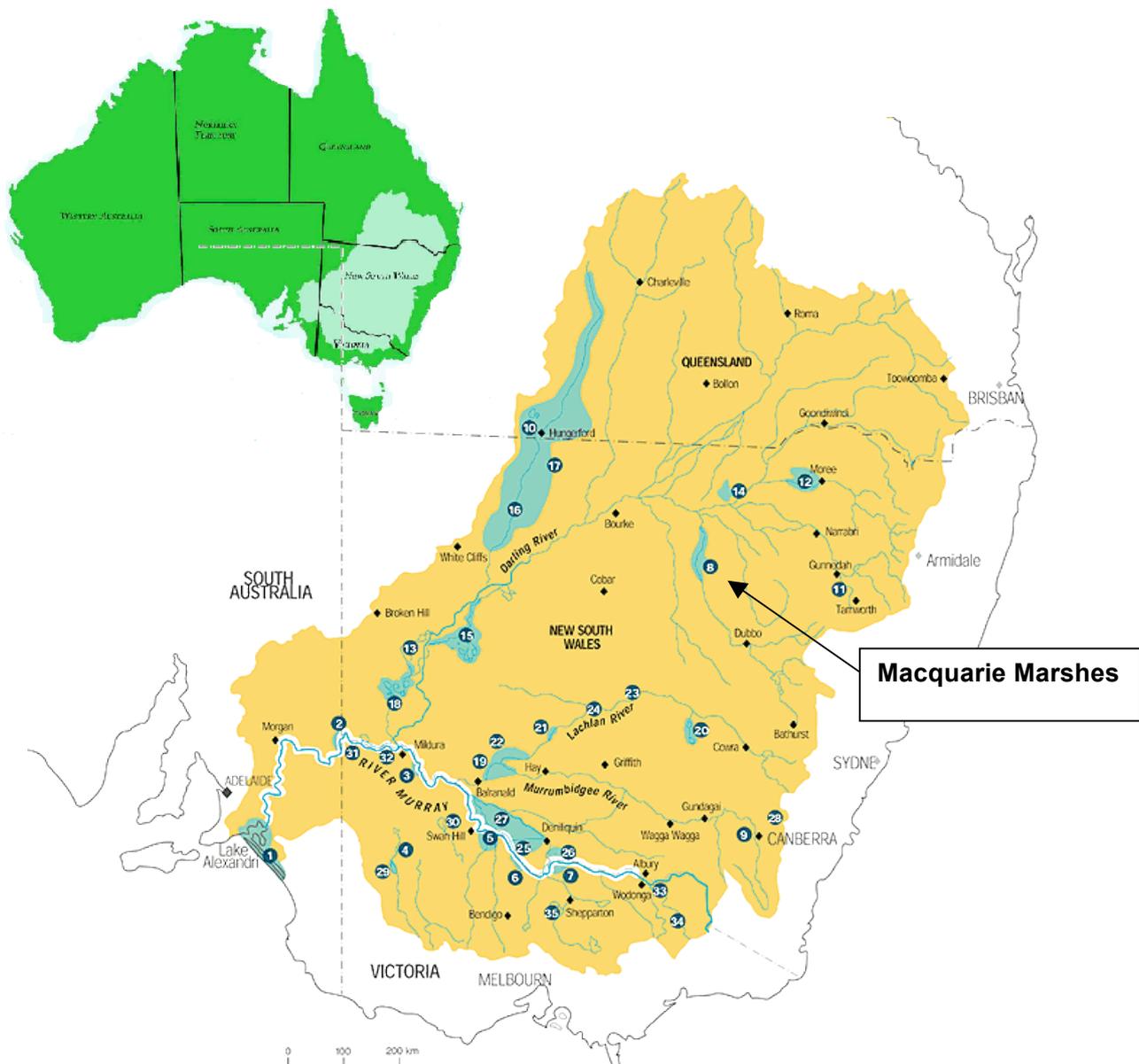


Figure 1

The Murray-Darling is a highly regulated and controlled river. The catchment supports a rich agricultural economy as well as supplying water to many large settlements. Due to a combination of dams and reservoirs it is thought that at any one time only 20% of the water reaches the ocean.

The Macqaurie Marshes

The Macqaurie Marshes cover an area of 200 000ha. They are located on the Macqaurie River, which feeds water into the middle course of Darling River in the state of New South Wales. The marshes include a variety of wetland types, ranging from semi-permanent marshes and lagoons to ephemeral wetlands that are inundated by only the largest floods. The core areas of semi-permanent wetland are typified by River Red Gum forest and woodland and large areas of tall grassland and low grassland swamp, which are inundated by overbank and overland flooding from many small channels.

Threats to the Macquarie Marsh

North-western NSW is a semi-arid place where water is more valuable than land. It is a place where water has created a clash of cultures and priorities - irrigated cropping versus grazing, the environment versus the prosperity of rural communities.

Cattle and sheep grazing have had a huge impact on the health of the Macquarie Marshes. During dry years cattle have tended to live in the reed beds, eating the reeds and trampling pathways or pads through them. These pathways then become eroded into channels during the next wet spell. Water travelling down these eroded channels no longer floods out onto the reed beds, and they die. In this way 60% of the reed beds of the South Marsh (around 2,200 hectares) were lost by 1963.

The Macquarie River is a heavily regulated river and flows into the Macquarie Marshes. The marshes have declined alarmingly over the past 30 years. Water extraction above the wetlands has stopped enough water flowing through to sustain the ecological character of the area. As a consequence, the marshes have shrunk by an estimated 70 percent. Great tracts of trees and reed areas have been lost. Recent droughts have only exacerbated the situation further.

The extent of the change can be seen in figure 2.

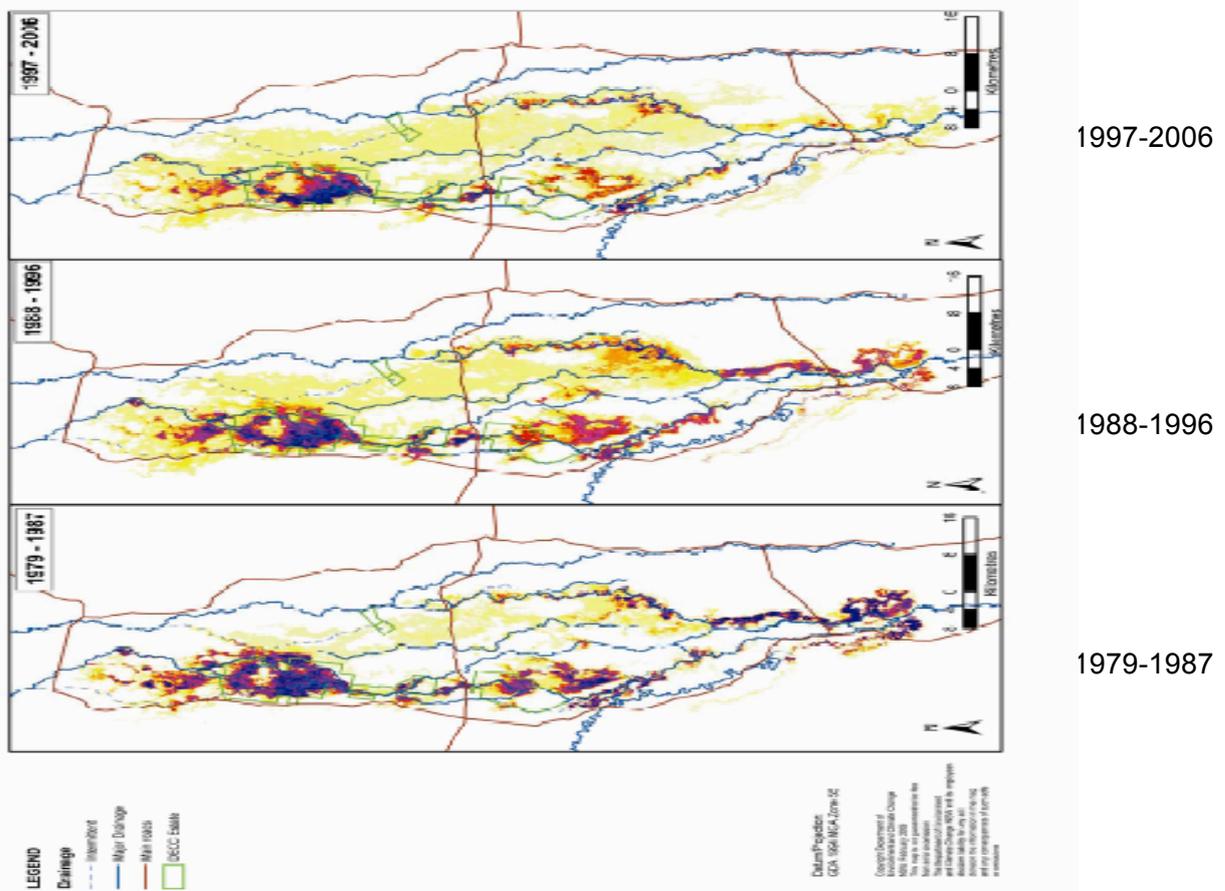


Figure 3.2 Changes in frequency and extent of Macquarie Marshes inundation. The area of low-frequency inundation increased in 1988–97 and again in 1998–2006 because of large floods that occurred in 1989, 1990, 1996 and 2000.

Figure 2

The area in the map shaded blue and mauve is the area of high frequency flooding or permanent and semi-permanent wetland. The areas shaded in yellow and cream show low frequency flooding or ephemeral wetlands. The satellite imagery clearly shows a shrinking in the area of permanent, semi-permanent wetland but an increase in the area of ephemeral wetland. The latter is described in the text below the figure as being attributed to single high magnitude floods in 1989, 1990, 1996 and 2000. This increase in ephemeral wetland provides worrying evidence for some politicians to argue that the Macquarie Marsh loss is being exaggerated. However, the alarming data in reality shows the shrinking of permanent, semi-permanent wetland estimated to be about 70 percent.

This staggering rate of loss is generally attributed to the almost uncontrolled allocation of water rights to irrigation upstream of the marshes. This irrigation is for arable farming including cotton, known to be one of the thirstiest cultivatable crops. The Burrendong and Windamere Dams restrict flow from upstream. Weirs and pumps reduce fish stocks and regulators and diversion channels divert water for private irrigation.

The construction of the Burrendong Dam was in 1967; its height is 76m high and its width just over 1km at the crest. The water depth is 57m and at 100% capacity it holds back 1,188,000 megalitres of water with a reservoir surface area of 7,200ha, equal to nearly 10,000 football fields, and the catchment area of the dam is 13,900 km². The purpose of the dam is for flood control but it also produces a small amount of hydroelectricity. The Windamere Dam is located 41km upstream from Mudgee on the Cudgegong River. It's 67m high and 825 meters wide at its crest. It can contain 58m of water depth, supporting a reservoir with a surface area of just over 2000ha.



Figure 3

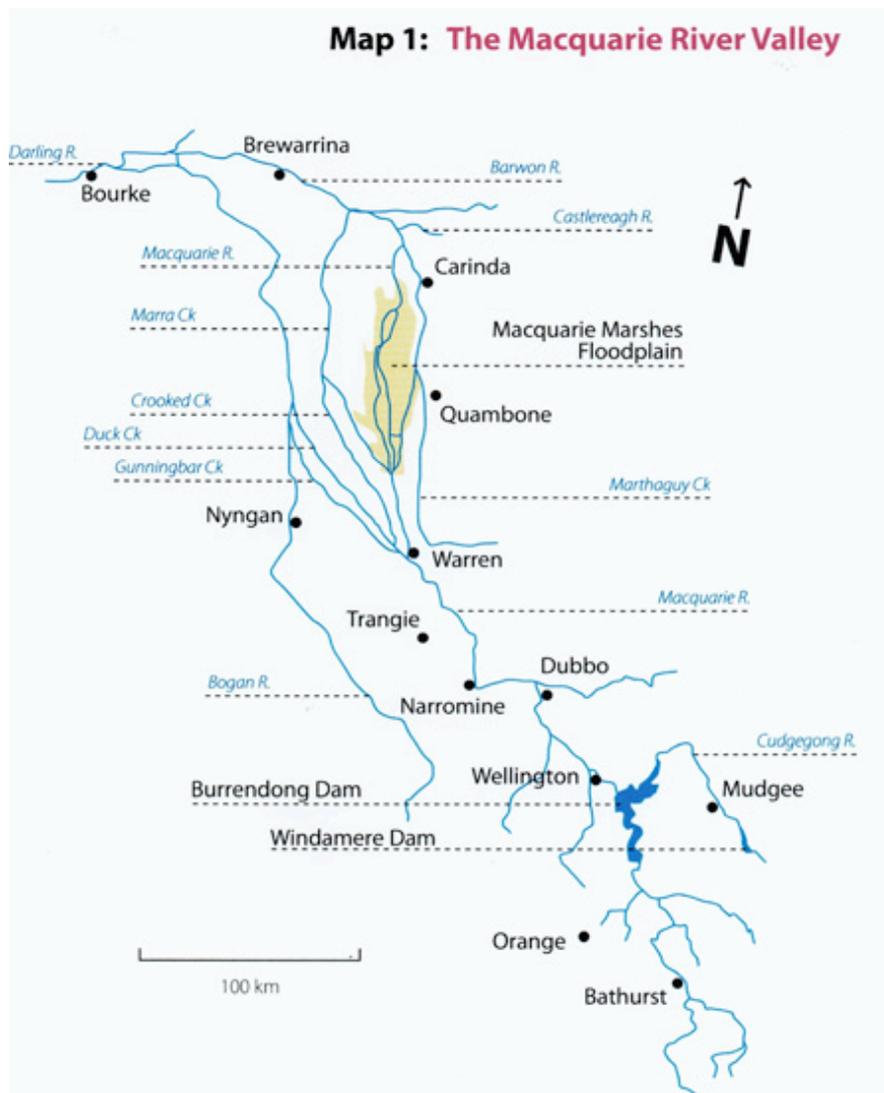


Figure 4

The dominant crops by value across the Macquarie catchment in 2001 were cotton (29.6% of all production by value), cereals for grain (27.4%), livestock for meat (20.9%) and wool (13.5%). Of these commodities only cotton is substantially irrigated. Other irrigation-dependent crops, such as fruit, wine grapes, vegetables and lucerne hay, are all present in the river catchment but only account for approximately six per cent of total output by value. Cotton production is highly concentrated. The shires of Narromine, Warren and Bourke – account for a substantial amount of cotton output for the catchment.

Management of the Macquarie Marshes

The Macquarie Marshes Nature Reserve and State Conservation Area totals 21,898 hectares and is managed by the NSW National Parks and Wildlife Service. The nature reserve is separated into two areas, the north and south marsh. The remaining 90% of the Macquarie Marshes is mainly private land managed for agricultural purposes. Approximately 50 pastoral farming families own this 90%. As a result, a lot of marsh area is fenced. Access to private land is completely restricted and due to private land encircling the reserve, public access is also restricted for most of the year to the reserve. The reserve carries international recognition under

The Ramsar Convention. Ramsar is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. This in turn ensures an urgency to regulate, protect and conserve the ecology of the wetland and therefore provides a framework for sustainable management as well as a political leverage for civic society groups to pressure the government into action.

It's impossible to look at the management of the wetland independently of its feeder rivers and wider catchment. The regulation of the Macquarie River and its feeder river, the Cudgagong is highly restrictive and controlling of water flow into the Macquarie. This reduces the number of low frequency high inundation events. In addition, due to the over allocation of water for irrigation, the area of permanent and semi-permanent wetland has fallen by 70 percent. Figure 5, shows the location of the Macquarie Marshes Nature Reserve. The decision to allow the production of cotton in such a naturally dry environment seems highly short sighted.

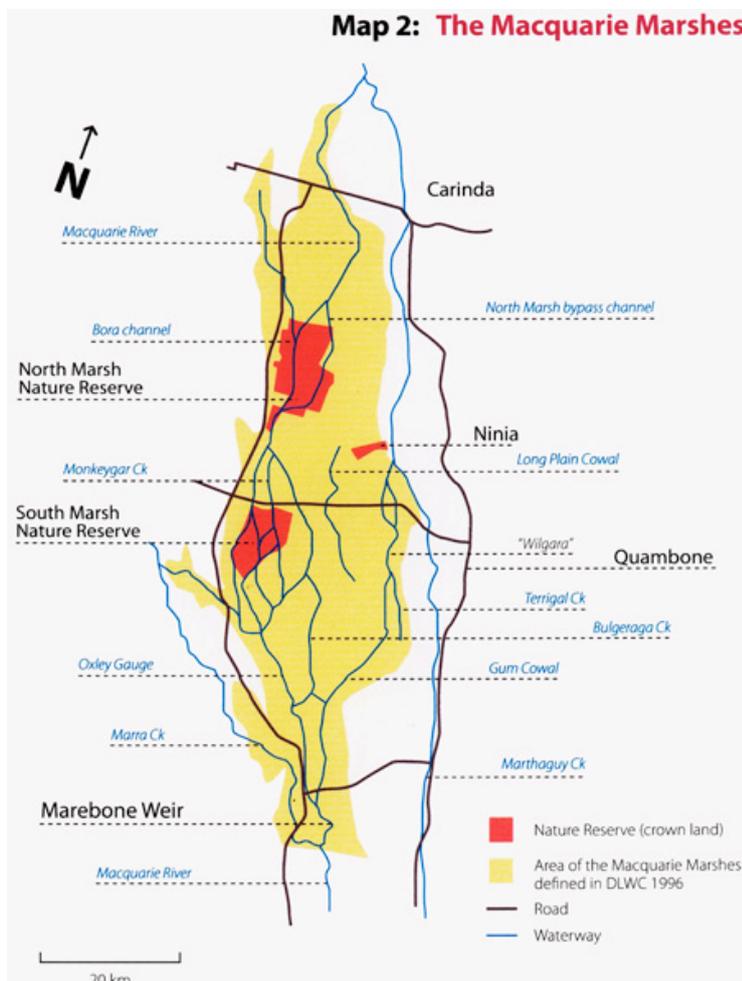


Figure 5

The Murray-Darling Basin Cap is the title given to the historic decision to restrict diversions of water from rivers at 1994 levels of development. This policy was supposed to halt degradation and apply to the whole river. Excluded from this policy was the management of floodplains themselves. A report in 2005 revealed through satellite imagery more than 2,000 km of earthworks - levees and channels - on the Macquarie floodplain. These structures alter the natural cycles of the floodplain and its organisms and effectively restrict water flow into the marshes.

The current policy is one of government buy-back. This entails the New South Wales government and National Government buying back the allocation rights from the irrigation industry and returning it to the rivers for environmental regeneration. As part of this buy back through federal funding assistance, the NSW Government has purchased 2436 hectares of the property and 8658 megalitres of regulated and unregulated water entitlements, which will be returned to the Macquarie Marshes. The Australian Government has purchased approximately a further 30 000 megalitres of general security water entitlement for the Macquarie Marshes. This is a very good step forward for securing the sustainability of the Macquarie Marshes.

However again, there has been no restriction or control on floodplain earthworks and channels that effectively harvest water before it reaches the wetland. While the earthworks on the Macquarie floodplain may not be illegal, taking part of the share of the allocated water for environmental regeneration seriously questions the effectiveness of the buy-back scheme. If the government is serious about the sustainability of the marshes then they must recognise this complexity. They must manage not just the main arteries but also the entire catchment including the floodplain. Good floodplain legislation and regulation is therefore needed urgently.

The Macquarie Marshes are subject to large variations in natural water supply. The wider catchment is subject to extended periods of drought and then wetter periods. The period of time between 2006 and 2011 saw significantly lower than average rainfall. As a consequence there was a great deal of pressure put on the Macquarie and the Murray-Darling as a whole. During these periods of drought allocations are restricted and farmers follow a trading mechanism on water allocation. These allocations fluctuate in price enormously. 2012 has seen rapid replenishment of water resources in the catchment due to high rainfall. Replenished water storages mean that many farmers are now receiving their full general allocation of water. Trading of temporary water allocations has ground to a halt in many areas. The price of water in one exchange fell to \$45 per megalitre, down from \$200 in 2011 and a peak of about \$1200 in late 2007. This trading mechanism serves to reinforce restrictions placed on water resources during dry periods.

One specific management strategy used in the Macquarie Marshes is burning-off. Burning-off top reeds is an ancient practice, consistent with the heritage of Aboriginal wetland burning. Aboriginal wetland burning is still in place in some wetland regions of Australia, such as the Kakadu National Park in Northern Australia. However, due to land access, Aboriginal land burning is not present in the Macquarie Marshes. However, cattle farmers and reserve managers do use wetland burning. The purpose of burning is to reduce the high vegetation cover of the marsh. In doing so, it protects the wetland from the worst effects of drought caused forest fires. With dense vegetation removed the forest fires are unable to establish themselves and damage the trees. The burning also creates space for fresh regrowth of wetland grasses and herbs that only improve pasture but also attract more wading birds, such as field geese. Wetland burning can be seen in the photos over the page:



Photo 25 Clearing and cultivation in the North Marsh. DECC has since then acquired this land on 'Pillicawarrina' for its estate. The Macquarie River is in the left foreground and background (W. Johnson).



Photo 27 Fire in common reed in the Northern Marsh Nature Reserve (W. Johnson).

Figure 6

In addition, to burning the wetland and through consultation with farmers, much stricter controls have been put in place. Water allocation to farmers upstream of the marshes is now much stricter. Water allocation is granted along with strict water management schemes. Modern technology must be used for monitoring soil moisture and water table levels. Water efficiency is a priority and more sustainable irrigation systems are being deployed. These technology changes are improving water efficiency. The ranches are now restricting grazing through fencing. Cattle and sheep are no longer relatively free to roam and in this way reed bed damage is being prevented. Although, recovery of already lost reeds will be slow.

One final consideration of wetland management concerns the cultural heritage needs of Aboriginal people. The indigenous people of the Macquarie Marshes, the Wailwan have a well-documented history and cultural connection to the Marshes. However, the modern period of Australia has stripped the Wailwan of their land rights, to the extent that nearly no Wailwan live today in the Macquarie Marsh area; as we have

heard 90 percent of the area is owned, by approximately 50 families. This private ownership also heavily restricts Wailwan from their cultural heritage.

Wailwan traditional descendents have identified the following six key priorities for the Macquarie Marshes:

1. Cultural flows to Country.
2. Access to Country in order to conduct cultural activities.
3. Inclusion in management of Country.
4. Training and working for Country.
5. Cultural continuity and heritage protection on Country.
6. Caring for Country: enacting cultural and ecological responsibility for Country.

The challenge in achieving these goals is largely related to access. Access to all private owned marshes is highly restricted. Private lands remain fenced and right of access is not easily attainable. Right of access also limits Wailwan to the Reserve and conservation sites. This is due to their situation being enclosed by private grounds. As a consequence, all of the above priorities are challenged.

Aboriginal people described the activities they want to be able to undertake as follows:

- Having access to Country in order to conduct cultural activities
- Having work, training and economic opportunities on Country
- Being involved in managing Country, especially in managing environmental water
- Forming partnerships with the NPWS in managing conservation reserves establishing an Aboriginal cultural flow of water.

The above points in affect help inform management decisions of the reserve and conservation areas. Again these priorities help inform the framework for wetland management.