

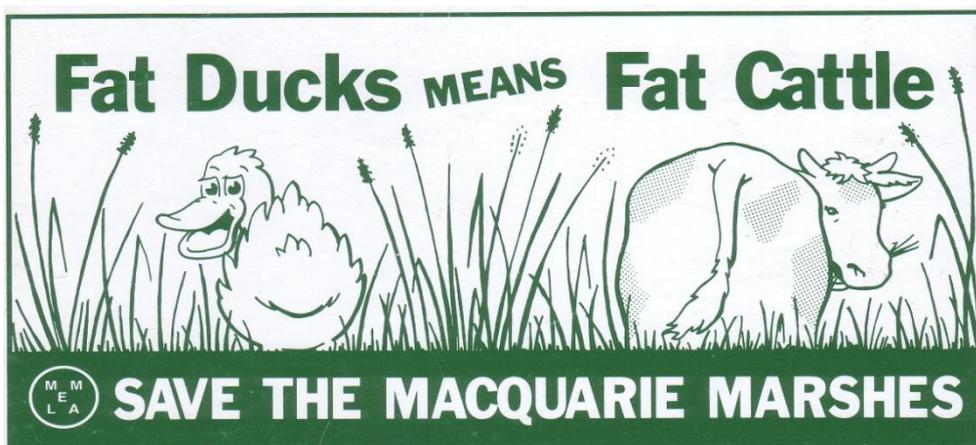


MACQUARIE MARSHES ENVIRONMENTAL LANDHOLDERS ASSOCIATION

Beef Productivity of the Macquarie Marshes



Photo courtesy of Donna Veech

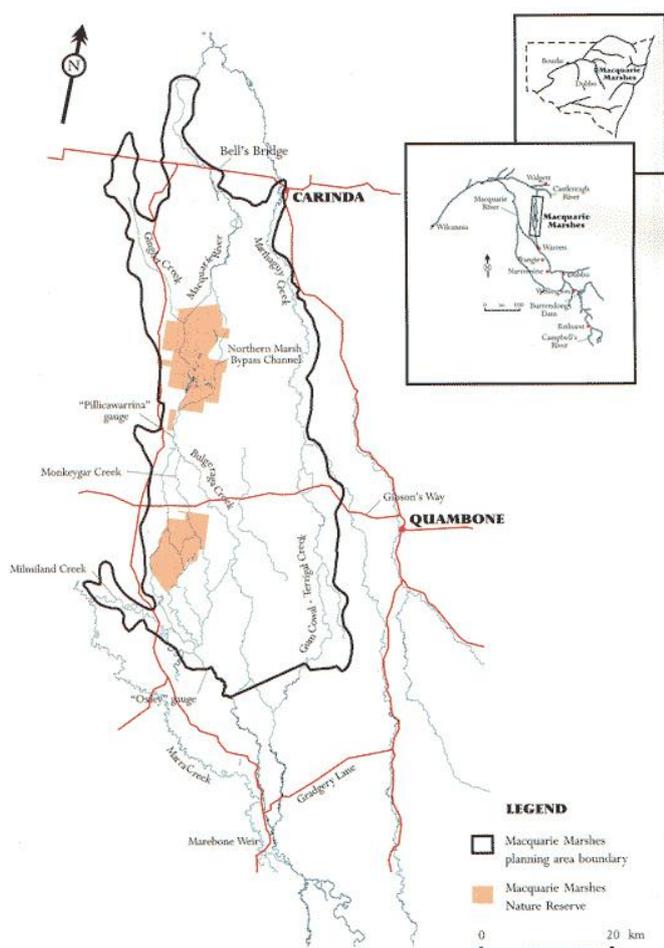


INTRODUCTION

The Macquarie Marshes is a large semi permanent, flow through wetland on the lower end of the Macquarie River in central west NSW. It covers an area of approximately 200,000ha of which 12% is a Nature Reserve managed by the NSW National Parks & Wildlife Service (NPWS). The remaining 88% is privately owned freehold land that supports an extensive agricultural industry, predominantly beef cattle production. Much of this land has been held in families for several generations and the property owners have an extraordinary knowledge and understanding of all aspects of the Macquarie Marshes.

The Macquarie Marshes were first settled in the 1830s and have reliably and sustainably supported beef cattle production from then until the Macquarie River was heavily regulated in the 1970s. Following regulation the beef cattle industry continues to be part of the Macquarie Marshes but landholders no longer have the security of reliability that they had prior to regulation of the river.

The Macquarie Marshes is unique both environmentally and economically. Research indicates it is the most important colonial nesting waterbird breeding site in Australia for species diversity and nesting density (Kingford & Auld 2000). The majority of the colonies are situated on privately owned land where landholders have looked after and protected them since settlement. The Marshes also support an extensive cattle grazing industry which is its main economic focus. Sustainable grazing is encouraged by the Macquarie Marshes Environmental Landholders Association (MMELA) and the majority of landholders are acutely aware of the environmental needs of the wetland and undertake appropriate management to ensure environmental assets are not compromised while undertaking sustainable beef production.



The Macquarie Marshes Nature Reserve, U Block and "Wilgara" Wetland are listed on the Ramsar Convention of Wetlands of International Importance. The Nature Reserve is also listed on the Japan - Australia Migratory Bird Agreement (JAMBA) and the China - Australia Migratory Bird Agreement (CAMBA). It is the responsibility of the whole community, including State and Federal Governments and the local community to ensure management of the wetland does not compromise values set out in the above mentioned agreements.

It is an accepted fact that the wetland and floodplain areas of the Macquarie Marshes do not respond as well to rain as the land outside the Marsh area. The majority of the vegetation species of the Macquarie Marshes are reliant on periodic flooding to thrive and provide both fodder for cattle and feed, shelter and habitat for native flora and fauna. If you take away vital flood water you vastly reduce plants' vigour and resilience and average or below average rainfall does not provide the nutrients or the inundation duration needed by these plants to flourish.

FLOODING

Extract from *Jenkins, K.M., Asmus, M., Ryder, D., and Wolfenden, B.J. 2004. Fish and macroinvertebrate communities in the Macquarie Marshes in the winter and spring of 2003*

“Under natural flow conditions the Macquarie Marshes was a renowned waterbird habitat and considered one of the most important drought refuges for waterbirds in NSW (papers referred to in Kingsford and Thomas 1995 from 1954, 1957, etc). During floods the floodplain and creeks were thick with aquatic macrophytes, such that it was impossible to use an outboard motor (Landholder anecdotal records and photographs). The Macquarie Marshes contained 42,448 ha of river red gum woodland and forest in 1949, one of the most extensive stands in Australia (Kidson *et al.* 2000a, b). The extremely high productivity of the Macquarie Marshes, as expressed by waterbirds, macrophytes and river red gum, is likely linked to the high frequency of flooding. For example, floods were predicted to occur naturally every 1.07 years in floodplain habitats with river red gum forests (ie. green zone), every 1.44 years in floodplain habitats with river red gum woodland (ie. yellow zone) and every 1.8 years in coolibah floodplain (ie. red zone) (Table 1, Breerton *et al.* 2000). The main channels that dissected the floodplain, (Macquarie River, Monkeygar Creek and Bulgeraga Creek) received small floods at least once a year and were seldom dry (MMMC landholder records 2004).

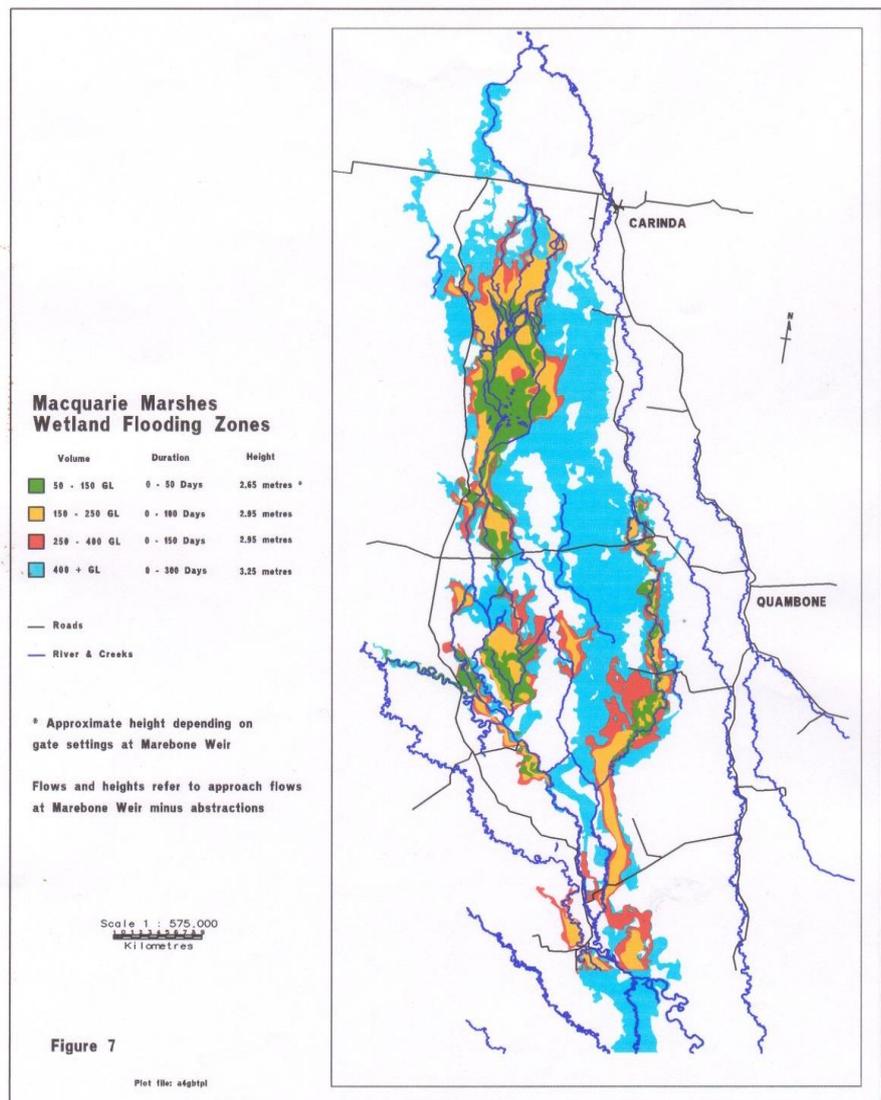


Table 1. Vegetation type and flood frequency in 5 flood zones described for the Macquarie Marshes under modelled natural flow conditions (Brereton *et al.* 2000).

Flood zones	Vegetation type in flood zones	Natural flood frequency
Purple	phragmites, cumbungi, water couch, mixed marsh	Every 1.00 years
Green	phragmites, cumbungi, water couch, mixed marsh and river red gum forests	Every 1.07 years
Yellow	The above plus river red gum woodlands, river red gum associations and ephemeral grasslands	Every 1.43 years
Red	The above plus river red gum association, lignum, coolibah, ephemeral grasslands and some black box	Every 1.80 years
Blue	The above plus drier coolibah and black box areas, myall, belah and ephemeral grassland areas	Every 2.50 years

Knowledge of the impacts of regulation on the natural water regime of the Macquarie Marshes relies on links between river flow (modelled or actual) and flood extent mapped from Landsat imagery (Kingsford and Thomas 1995). This is similar to most floodplain wetlands in Australia, due to the lack of water gauging stations (flow or height) located within wetlands. In contrast, in the Macquarie River there are a number of gauges dating back to 1944 and changes in water regime are well documented. Two studies on the impacts of river regulation on the Macquarie Marshes, provided insight into different aspects of water regime. Brereton *et al.* (2000) used modelled IQQM data and Landsat imagery of flood extent to compare flood frequencies in 5 flood zones under natural (Table 1) versus regulated flows (1986 and 1996 Water Management Plans). The modelling approach highlighted that the Marshes is composed of a mosaic of floodplain with differing water regimes. It identified two critical changes to water regime in the Macquarie Marshes due to regulation, firstly the reduction in flood frequency particularly of smaller floods, and the shift in the timing of flooding primarily from winter-spring to spring-summer (Brereton *et al.* 2000).

Kingsford and others (1995, 1998) examined actual annual flows, rainfall and flood extent over a 50 year period (1944-1993). The first 24 years preceded the major regulation impacts in the system and included major flooding in the 1950s. The latter included the commissioning of Burrendong Dam (1968), major flooding in the 1970s, flooding in the early 1980s and the 1990s, and the increase in irrigation in the Macquarie Valley in the 1980s. Kingsford and Thomas (1995) found that annual flows at Oxley decreased significantly for high and medium rainfall events and the areas flooded by large floods contracted by at least 40-50%. Fifty-one per cent of water passing Dubbo each year reached the Macquarie Marshes between 1944-1953, but this declined to 21% by 1984-1993 (Kingsford and Thomas 1995). Analysis of actual flows at Oxley (1996-2003) found an average **reduction in flows to the Marshes of around 207,000 ML / year** compared to flows in the period 1943-1965 (MMMC unpublished analysis of Oxley gauge records)".

This reduction in flows to the Macquarie Marshes, and throughout the Murray Darling Basin (as this situation has been replicated in other river systems throughout the Murray Darling Basin) resulted in the establishment of both the NSW and Federal 'buy back' programs. The 'buy back' was recognised as being the quickest and most cost effective means of returning water to stressed rivers.

It must also be recognised that by keeping the Marshes wet, or at least damp, it uses far less water than if it is allowed to dry out and become ‘parched’. The deep heavy black mulching soil takes a considerable amount of water to its profile. Once the Marsh is wet or even damp, it takes very little water to maintain this state and to ensure water continues to flow to the end of the system and meet its obligation to provide base flows to the Barwon Darling. Rainfall events have a much great beneficial impact on this area if the soil has some moisture already on the profile.

The Macquarie contributes approximately 20% flows to the Barwon River system. The water the Barwon receives from the Macquarie is of high quality as it has been filtered by the aquatic vegetation as it flowed through the Macquarie Marshes. These flows are also some of the most valuable flows in both the Macquarie and Barwon rivers as they have multiple uses eg. they provide environmental benefits such as supporting colonial nesting waterbird breeding events, enhancing vegetation growth and enhance fish breeding. They also have economic benefits such as supporting the floodplain grazing of beef cattle, provide soil moisture for grain cropping and irrigation water further downstream.

This is one of the reasons MMELA has so strongly supported the ‘buy back’ program as it has a huge “bang for its buck” when you consider the vast number of benefits that come from each megalitre of water purchased.

BEEF PRODUCTION

Beef Production was established in the Macquarie Marshes in the 1840s and continues to be the major economic industry in this area. It is seen to be sustainable and hence the phrase “**Fat Ducks Means Fat Cattle**” that has been associated with the Macquarie Marshes for many years.

The vast majority of the colonial nesting waterbird breeding colony sites being on private Marsh land that has been grazed by cattle for over 150 years. Only one major colony remains on the Macquarie Marshes Nature Reserve.

Up until 1989 the Macquarie Marshes Nature Reserve was leased out to graziers for beef cattle production. The recommended stocking rate by the National Parks & Wildlife Service (NPWS) in the 1985 Management Plan was 1 cow & calf to 10 acres (4.05ha). This was considered to be sustainable both economically and environmentally and was monitored regularly by the NPWS. The surrounding marsh land was grazed using the same stocking rate however as flooding size and frequency has reduced so has the ability to maintain this stocking rate. In the drier times during the 2000s some graziers have reported stocking rates as low as 1 cow to 150 acres (60ha)

The recommended stocking rate by the Central West Local Land Services (2013 Land & Stock Returns) for land to the immediate east of the Macquarie Marshes under average seasonal conditions is 1cow to 19 acres (7.7ha), approximately half that of the Marsh area in average seasonal conditions, much less the Marsh area. This is why the Macquarie Marshes have been so valued for beef cattle production and prior to river regulation were seen as very safe (almost drought proof) grazing land.

The majority of beef producers in the Macquarie Marshes run self replacing beef cattle herds (cows having calves each year with the steer portion being sold annually along with cull heifers and cast for age cows) which means the number of breeding cows on the property remains static as older cows are

sold off and young heifers are kept to replace them go on into the breeding program. Under these regimes stock sent for sale average 400kg live weight.

The beef yield of cattle after slaughter is between 52% & 54.7% (NSW Department of Primary Industries Primefacts January 2007). Working on 52% yield for this report equates to 20.8kg of beef per acre or 51.37kg per hectare (One 400kg (live weight) beast sold yielding 52% beef = 208kg off 10 acres (24.7ha) = 20.8kg per acre (51.37 per ha).

Table 2. Annual Beef Production under current water regime (This is in conjunction with environmental benefits)

Flow past Marebone (ML)	Area Flooded ha	Cattle Produced	Kilograms of beef	Australians Fed	Frequency in Years
700,000	145,000	35,802	7,446,816	225,661	10
400,000	81,000	20,000	4,160,000	126,060	6
250,000	50,000	12,345	2,567,901	77,815	3-4
100,000	19,000	4,691	975,802	29,569	1-2
58,000	9,000	2,222	462,221	14,006	1
30,000	4,000	987	205,431	6,225	0.5-1

❖ Information on flow rates and area flooded supplied by the Office of Environment and Heritage NSW and the Marebone gauge.

❖ Australians eat on average 33kg of beef per year (National Farmers Federation – Farm Facts 2012)

As you can see as flows reduce so do the number of cattle being produced thus putting strain on supply and so the price of beef in our supermarkets rises. As a result of this much less beef is produced and the smaller amount that is becomes cost prohibitive to many in the community.

The reduction in flooding under natural conditions compared to today (207,000ML on average per year) equates to a loss of beef production of 10,122 cattle = 2,105,376kg beef that would have feed 63,799 Australian people.

While a 400kg beast yields 52% of beef the remaining 48% of the beast is not discarded it also has a considerable value. Co products or By products such as: (Meat and Livestock Australia reports)

 The hide – leather goods, floor rugs etc

 Bones, blood and Offal – blood and bone products for gardens

 Tongue and cheek – sold for human consumption

 Other offal – some sold for human consumption (tripe and heart) and some for pet food.

are important to the national economy as well as some being part of the export market.

Local businesses and services benefit from having a healthy and sustainable grazing industry in the Macquarie Marshes as graziers purchase the majority of their inputs such as drenches, lice control etc locally and use local contract labour. This has a positive flow on effect to the socio economic well being of the local communities.

There are also positive impacts for wider regional communities with the larger livestock selling centres often used to sell stock from the Marsh area. Feedlots and abattoirs also receive cattle from this area so their workers and supplies also benefit. The flow on effects are considerable and not to be underestimated.

OVER VIEW

MMELA was, and continues to be, very supportive of the 'buy back' approach to return water to our still stressed and over allocated river systems. This organisation has always seen 'buy back' as the quickest, most cost effective and equitable means to increase water availability for rivers, floodplains and wetlands.

Beef cattle production on floodplains and in wetlands flourishes as a result of flooding however it does this without extracting or taking water from the system. Therefore this water can continue on through the river system and benefit many graziers as well as any identified environmental assets downstream. It is extraction of water from the system that has the biggest detrimental impact, to both ecological communities as well as graziers on the downstream side of the extraction.

There has been criticism from other sectors of the community that water returned to river systems for environmental purposes has no real value. As you can see water purchased by governments can help to feed a rapidly growing population while still achieving the environmental benefits for which the water was targeted.

MMELA also acknowledges that the 12% of the Macquarie Marshes now managed by the National Parks and Wildlife Service (NPWS) is no longer used for grazing. However it must be accepted that the value and contribution of this area of the Marshes to the Australian population must be equal to, or greater than that of beef production or it would not have been retired from grazing.

It must also be understood that if a greater area of the Macquarie Marshes was to be taken out of production, as suggested by another section of the community, this then poses a cost burden on the Australian public as it is the tax payers who must fund the ongoing staffing and management of the land and ensure such management tasks as weed and feral animal control, infrastructure maintenance and bush fire management etc.

CONCLUSION

MMELA trusts this paper helps to clarify the importance of maintaining programs such as the 'buy back' for both environmental and economic purposes. The current and future value of the beef cattle industry in the Macquarie Marshes is vital to the survival Marsh landholders and our local communities as well as having an important role in wider regional economies.

To imply or say water purchased by governments in 'buy back' programs as no real value to communities is not only incorrect but it is irresponsible as the benefits are great and far reaching.

We thank you for taking the time to read this paper and should you have any questions or comments, please do not hesitate to contact this organisation.

REFERENCES

Kingsford and Thomas 1995

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Jenkins, K.M., Asmus, M., Ryder, D., and Wolfenden, B.J. 2004. Fish and macroinvertebrate communities in the Macquarie Marshes in the winter and spring of 2003

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