14

When our rivers ran dry – 30 years of water resource development in the Murray–Darling Basin

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Introduction

The lower Balonne River floodplain begins where the Balonne River splits into its main streams and braided channels (Fig. 14.1). Water then flows south-east into the Ramsar-listed Narran Lake and to the west, down the Culgoa, Birrie and Bokhara Rivers to the Darling River. There are ~1600 km of main river channels in this Lower Balonne system. Most of the floodplain of the Condamine–Balonne catchment is in the Lower Balonne, the largest in the Murray–Darling Basin (Kingsford *et al.* 2004). This floodplain was once excellent for cattle

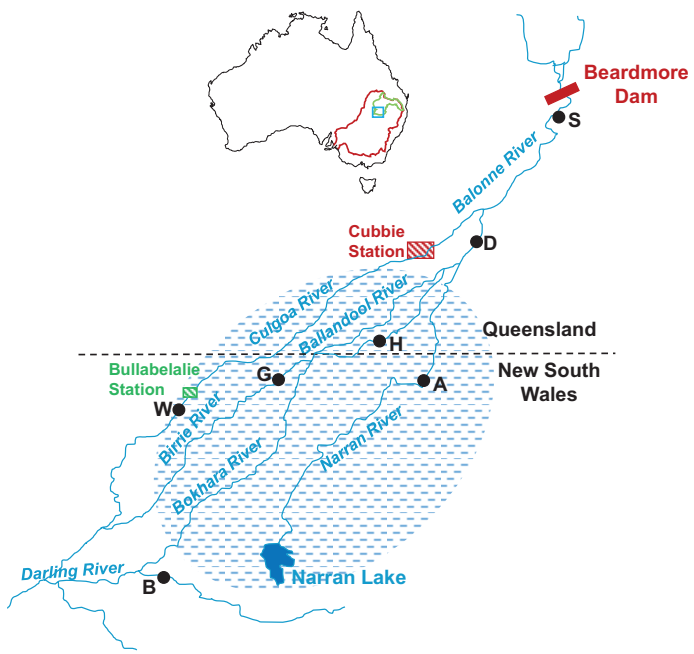

Fig. 14.1. The Lower Balonne system, shown in the inset (square), within the Condamine–Balonne catchment of the Murray–Darling Basin in south-eastern Australia. The Lower Balonne system crosses the Queensland and New South Wales border (dashed line) and diverges down four different rivers, one of which supplies the Ramsar-listed Narran Lake system. There are also urban centres (filled circles, A – Angeldool, B – Brewarrina, D – Dirranbandi, G – Goodooga, H – Hebel, S – St George, W – Weilmoringle), Beardmore Dam (government-built dam), Cubbie Station, a major irrigation property, and our Bullabellalie Station affected by reductions in flow.

and sheep production, benefiting from the widespread and variable floods and a reasonably reliable annual rainfall of 350–450 mm. The flooding was essential, providing the soil moisture for pasture growth, which lasted for up to two years. For example, native millet (*Panicum decompositum*) produces dry matter yields of up to 5 t/ha after a flood (Queensland Department of Primary Industries and Fisheries 2007).

The river system

The flow of the Balonne River is incredibly variable, with an average flow at St George of ~1.2 million ML/year before it was developed. More than 51% of this annual water volume between 1920 and 2013 was in just 20% of years. In the other 80% of years, the average flow was about half the average volume, with 30% of the total volume passing St George in this period occurring in just five events: 1950, 1956, 1976, 1983 and 2011. The highest annual flow at St George was 800% greater than the average annual flow, considerably more variable than the River Murray.

Before water resource development upstream of our property of Bullabellalie (Fig. 14.1), floods came and went, extending our pasture growth through the dry times. The scale of our productivity went up with increasing volume, height and duration of flooding, which was also dependent on antecedent conditions and upstream catchment conditions. Even when we did not have rainfall, the floods came and benefited us. For example, heavy local rainfall (200–300 mm over two days) ~160 km upstream in 1981 produced a small flood on our station, Bullabellalie. This event was critical for us, allowing my family to retain 250 core breeding cows for another three months, until it rained. Without the flood, we would have incurred an opportunity cost of about $250 000. This would have included selling cows onto a depressed market and the cost of later needing to replace them. Floods mean money to many of us who produce livestock from the floodplains of rivers (see Chapter 11).

It is not just the people of the floodplains who benefit from the rivers. The local towns of Dirranbandi, Hebel, Angledool, Goodooga, Weilmoringle and Brewarrina (Fig. 14.1) have also prospered since 1860, with the production from the healthy rivers and floodplains of the Lower Balonne. This all changed with irrigation development upstream of the Lower Balonne in the Condamine–Balonne catchment of the Murray–Darling Basin.

The age of development

The Condamine–Balonne river catchment was the last major river in the Murray–Darling Basin to be developed for its water resources (Kingsford 2000a; Thoms 2003; Kingsford 2004) and the environmental and social consequences are all too apparent. Development started in the Lower Balonne when the first broad-scale irrigated cotton was grown in 1972, after Beardmore Dam at St George was finished, storing 81 000 ML (Fig. 14.1). This was beginning of the end for the health of the rivers, starting the first major reduction in the volume, extent and duration of the flooding in the Lower Balonne system. Initially, the irrigation scheme struggled, as farmers tried different crops and experimented with which seasons to plant in. Agronomy, technology and skills improved, particularly for the cultivation of irrigated cotton. There was a strong social drive, backed by the mantra to diversify, which beckoned struggling grazing enterprises. Concerted water resource

development began in the 1980s, increasing through the 1990s, before reaching its full potential in 2001 when ~1.2 million ML of private storage was built, just upstream of the Lower Balonne floodplain (see Chapter 15). The staggering scale and rate of development culminated in enough private storage to take all of the average annual flow in the river system (CSIRO 2008a).

The accelerating irrigation development was fuelled by a boom in floods, relatively low development costs, few legislative barriers (see Chapter 21) and little cost for water, as well as excellent returns on investments in irrigated cotton. The local economies of St George, Dirranbandi and Hebel flourished, as new businesses and professions rushed into the area to service the development boom. Much of the boom by large-scale developers was probably funded by offsetting their development costs against business interests elsewhere.

Federal and state politicians from both major parties and their agencies jumped on the bandwagon, supporting this wealth creation and apparent economic success story. They brushed aside the complaints of downstream floodplain graziers or states and ignored caution about long-term impacts. Downstream communities in New South Wales were bitterly opposed, pointing out the inevitable consequences that were all too apparent on other river systems in the Murray–Darling Basin (Kingsford 2000b; see Chapter 16). The communities of Hebel and Dirranbandi also divided along these lines. Before long, the damage was all too apparent. The reliable low and medium floods disappeared, sucked into large storages (Fig. 14.2), and the rivers seldom broke their banks to flood. There was no longer enough

Fig. 14.2. Cubbie Station lies upstream of the Lower Balonne floodplain and has storage capacity to hold more than 500 000 ML of river water in large off-river storages, predominantly to irrigate cotton. This has decreased flooding downstream, incurring significant impacts on downstream communities (photo, R. T. Kingsford).

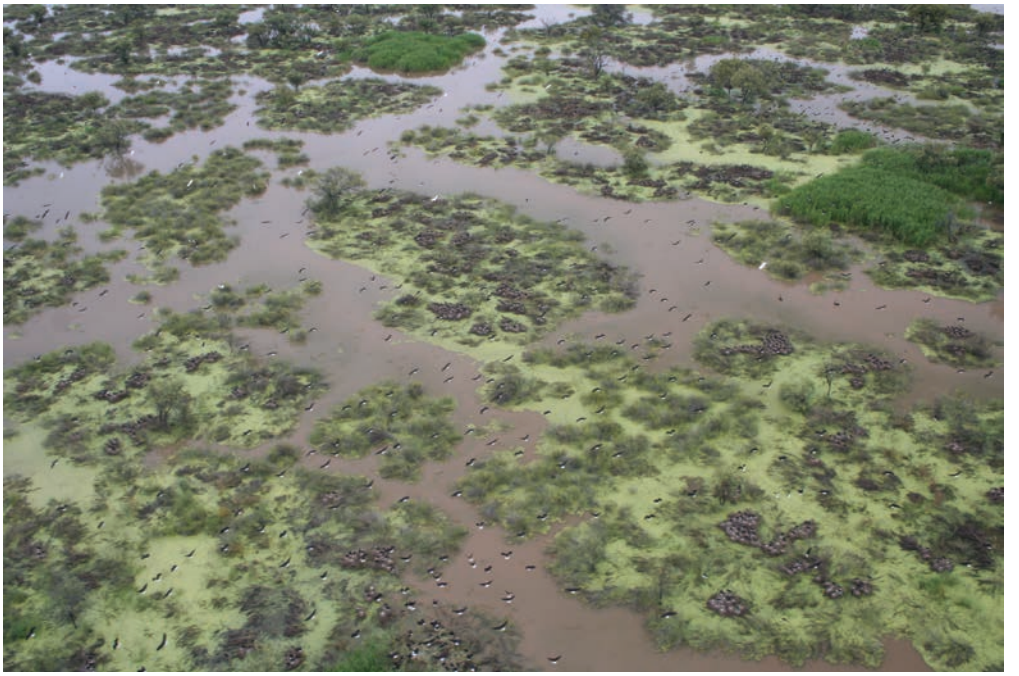

Fig. 14.3. Floodplains of the Narran Lake system, an internationally listed Ramsar site, like all floodplains on the Lower Balonne, rely on river flows from upstream, triggering widespread flooding and breeding of colonial waterbirds. Diversions of flows upstream to irrigation development have reduced the frequency of breeding events and degraded floodplain health (photo, R. T. Kingsford).

water to reach the end of the Lower Balonne system, except in extremely large floods. The social and economic impacts were real and harmful, even affecting the reliability of essential river flows for livestock and homesteads (stock and domestic flows). Downstream graziers and communities at Goodooga and Weilmoringle were particularly stressed (Fig. 14.1).

The speed of development and lack of government transparency were overwhelming (Tan 2000). Grazing communities were slow to respond, struggling to build cogent arguments and evidence that would convince legislators and bureaucrats (see Chapter 15). These grazing communities had a deep understanding of the complexity of the flows in the river which did not match the simplification and jargon of water management. Their pleas fell on deaf ears, possibly because of the complexity of explaining changes to flows in such a variable system and a perception by some government officers that the grazing industry belonged to the Stone Age. The scale and depth of impact that irrigation brought to all who lived on the Lower Balonne floodplain, including the irrigation communities, was all too apparent with the Millennium Drought.

No water flowed into internationally important Narran Lake (Fig. 14.3) for over a thousand days, defying the history books and exceeding the longest previous dry spell by about 400 days. The lakes system was renowned for its spectacular colonies of breeding birds, but even these were severely affected by the effects of water resource development

(Brandis *et al.* 2011). This was not natural, but all too explainable. Three flows at St George would have reached the lake, but were diverted for irrigation. In a natural system, the floods of 2004 and 2008 would have inundated substantial areas of the floodplain. There was widespread death of large areas of flood-dependent vegetation, including coolibah (*Eucalyptus coolabah*) and lignum (*Duma florulenta*).

Development also profoundly affected irrigation communities, after the set-up phase. The build-up phase was over, no longer demanding significant employment input. Exacerbating this, improved crop varieties reduced the need for as many chemical sprays and the need to employ people to weed the cotton (cotton chippers) or bale cotton when round-bale cotton harvesters arrived. Production of cotton per hectare doubled over 15 years, while employment numbers significantly decreased. The employment bonanza of the previous decade disappeared. Some irrigation businesses went into receivership, with Cubbie Station accumulating debts of about $300 million in 2013 (Locke 2013).

The legislative battle

In the 1990s, serious high-level national discussions reverberated about the levels of unsustainable development across the Murray–Darling Basin, particularly in the Lower Balonne system. The policy-makers and legislators had failed to constrain the level and speed of development. There was little consideration of the evidence backed by rigorous science for likely environmental impacts in the Lower Balonne. The implementation of policy and licensing left much to be desired (see Chapter 21), with little consideration about downstream impacts on communities or floodplain environments (Kingsford 2000a).

From the early 1960s, water harvesting licences were given out, mainly to landholders, mostly graziers, wishing to grow fodder for livestock. These licences triggered the boom in water resource development, largely unconstrained by policy. Limits to take water from the rivers were largely only constrained by the size of the pumps, available storage capacity and the water in the river. The Queensland water legislation did not define floodplains as part of the rivers (Gibbs 2009) – a catastrophic loophole for the river and its dependent communities. The rivers flowed reasonably frequently, providing further unrealistic expectations of reliability to the irrigation industry. Finally, recognising the rapidity of development in the early 1990s, the Queensland Government introduced a Water Allocation Management Plan (WAMP), following similar processes across the Murray–Darling Basin. There was also a cap on diversions across the Murray–Darling Basin, agreed by all the states in 1995, but Queensland managed to delay implementation for another five years, allowing further development in the Condamine–Balonne, affecting the Lower Balonne system and our livelihoods.

The volume of water that private water storages (Fig. 14.2) could capture grew by 500%. The WAMP process was discarded in favour of a new planning framework, the Water Resource Plan, implemented through a Resource Operations Plan. Large irrigators lobbied for more development, arguing this was possible using overland flow. This new policy position for overland flow was invented even though unknown for any other part of the Murray–Darling Basin. The concept was simple. The irrigation industry argued that

because its members had developed large parts of the floodplain for their private storages and crops, the rivers could no longer flow onto these parts. The irrigation community argued and then calculated what volumes of water were forgone, if there was a natural floodplain. They successfully convinced a compliant Queensland Government that this volume then needed to be added to their water harvesting licences. If any semblance of equity existed, the same argument should have been applied to the downstream floodplains on graziers' stations, whose water was taken by the irrigation developments upstream. The overland flow concept excluded all other rights to water on the floodplain. Once again, the lobbying power was effective; a 'loop hole' was identified. The Queensland water agency allowed further take from the river to a voracious irrigation industry. It did not help that more than half of the wetlands in the Condamine–Balonne catchment were in New South Wales (Kingsford *et al.* 2004), a considerably smaller proportion of the catchment, with most of water coming from Queensland. In 2004, the Lower Balonne Water Resource Plan was passed into law (Queensland Government 2004), the first year that the full impacts of development affected a flood.

The Murray–Darling Basin Plan was introduced in 2012 (Murray–Darling Basin Authority 2012), with a commitment to review the state of the science in the Darling Basin (Murray–Darling Basin Authority 2016c). Under the Basin Plan, there was a commitment to return 390 GL/year, from current diversions in the Darling River catchments, including the Condamine–Balonne, to the river environment. In late 2016, the Murray–Darling Basin Authority proposed that this volume of environmental water be decreased to 320 GL/year, with a reduction from 142 GL/year to 100 GL/year in the Condamine–Balonne catchment (Murray–Darling Basin Authority 2016a). This reduction in environmental flow meant that the Australian Government would not buy back water from the irrigation industry and, in so doing, reduce the socio-economic impact on the Queensland town of Dirranbandi. The transparency of the science and the hydrological modelling had improved, but the modelling during periods of low flows was extremely unreliable.

The impacts

About 50% of the water that once went to the environment in the Condamine–Balonne is now diverted, categorised at a very high to extremely high level of development, ranked third-highest out of 18 catchments in the Murray–Darling Basin (CSIRO 2008b). Much of this water would have inundated the vast floodplain of the Lower Balonne river system of more than 1.4 million ha (Kingsford *et al.* 2004). By 2008, only 5% of the flow reached the Darling River and there was widespread evidence of damage to the floodplain. There was such concern within government circles about the long-term impacts that a review of the science was commissioned, chaired by well-known freshwater scientist, Professor Peter Cullen (Cullen *et al.* 2003). The irrigators seized on a comment in the review that the floodplain was currently in good condition, avoiding mentioning the subsequent warning that impacts take time to show up. Professor Cullen later remarked that 'by the time they get the science right, the patient will be dead' (Senate Standing Committee on Rural and Regional Affairs and Transport 2006). The irrigation industry cleverly used highly selective

scientific results and strong political influence to once again derail a planning process in search of sustainability.

The federal Water Minister in the Liberal National Party Government, the Honourable Malcolm Turnbull, visited Bullabellalie in 2005, acknowledging the serious impacts of water planning in the Lower Balonne system. There were widespread triple bottom line impacts to social, economic and environmental values (see Chapter 15). Vegetation dependent on the floods continues to die across large expanses of the floodplain. New South Wales and Queensland have gazetted national parks on either side of the border, largely reliant on floods from the Culgoa River; there will be inevitable long-term consequences for these national parks – a case of the powerlessness of the environment arm of governments. Floods of most sizes, the prime drivers of productive grazing, are gone except for occasional large floods. Irrigation development upstream of the Lower Balonne floodplain has cost each floodplain grazing enterprise on average of ~20% of their production (Murray–Darling Basin Authority 2016b).

The Northern Basin Review of the Murray–Darling Basin was completed in 2016 (Murray–Darling Basin Authority 2016c) with the recommendation to reduce the amount of water to be returned to the environment by 70 GL year (Murray–Darling Basin Authority 2016a). It is unlikely that there will be any real environmental improvement for the Lower Balonne floodplain, especially in terms of the key elements of reducing the interval between flows and increasing the duration and extent of flows, particularly in the low flow years. Intervals between flows show no improvement. The internationally important Narran Lakes system (Fig. 14.3) will continue to decline in environmental value.

Development of irrigation has already had a significant impact on the finances of graziers, with the recommended flows under the Northern Basin Review only projected to improve production by 6%, compared to the 20% impact. Other socio-economic impacts were not measured, including the lost environmental productivity of the floodplain and the increased cost of providing alternative water supplies for downstream communities (see Chapter 15).

The future

The development horse has bolted, leaving a fractured and broken floodplain community on the Lower Balonne system, with significant social, economic and environmental consequences. There was some opportunity to rehabilitate some of the floodplain, through the Murray–Darling Basin Plan. Its main aims were to identify fair, efficient and sustainable use of the water across the Murray–Darling Basin rivers, including the Lower Balonne system. This was a major breakthrough but implementation for sustainability seems largely unreachable. Since 2012, the process of implementation has increasingly moved away from transparent and rigorous decision-making, with increased politicisation reflected in the recommendations of the Murray–Darling Basin Authority to reduce the environmental portion in the Condamine–Balonne by ~30% (Murray–Darling Basin Authority 2016c). My hope is that rigorous assessment of floodplain inundation could identify the watering requirements for these floodplains and the Narran Lakes system (Figs 14.1 and 14.3), setting a pathway for some environmental and economic recovery of the Lower Balonne floodplain.

Further, whatever the final amount of water to be returned to the environment, actual delivery depends on significant coordination and goodwill. Inflows into the Condamine–Balonne are declining due to unmeasured interceptions affecting the volume of water to the Lower Balonne floodplain. The Northern Basin Review identified poor compliance in the management of water, particularly in relation to low flows, publicly exhibited to the Brewarrina communities by the Murray–Darling Basin Authority in September 2015 at a Northern Basin Community consultation meeting. We need to improve measurement of water diversions and their regulation. With the significant concessions given to the irrigation industry and poor compliance, reduction in flows to the environment will continue to undermine sustainability and further reduce flows into Menindee Lakes on the Darling and eventually into the River Murray. Without marked improvement in flow recovery and its implementation, the Basin Plan will fail, leading to ongoing uncertainty and ongoing reform. Political will that ensures transparent coordination is essential.

The lessons from the development of the Lower Balonne floodplain are simple. Small irrigation development leads to big irrigation development, as increased lobbying by irrigation industries allows more and more water to be developed. We need strong leadership, not beholden to sectorial interests, able to bring people of the Lower Balonne together and provide transparent outcomes that encourage greater and innovative irrigation production with less water. The environment needs more water and those of us who traditionally relied on natural floods need this water. Without this, the natural systems and people who rely on floodplain environments have little chance in the centuries ahead to recover the health and productivity of these magnificent river systems. The often quoted lines of Dorothea Mackellar that Australia is a land of '… droughts and flooding rains' has fostered perceptions that both occur in equal measure. They don't. The intervals between these floods have increased a lot in the Condamine–Balonne. Our developed systems need a base flow of water, through different climate scenarios. We need adaptive management. We need to ensure we reduce the lengths of the dry intervals between flows and increase longitudinal and lateral connectivity. And we need intergovernmental commitment and coordination to make sure this happens. Finally, we cannot afford to lose any more environmental water.

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