Too much water: How salinisation transformed Australia's 'food bowl', 1945–2017

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Abstract

Australia's 'food bowl', its largest irrigation region—the Goulburn–Murray Irrigation District (GMID) in Northern Victoria, in the south-east of the Murray–Darling Basin—was transformed dramatically between 1945 and 1994. The reason was salinisation, a result of 'too much water'. Unsustainable irrigation practices caused what in 1987 was called 'Australia's greatest environmental threat'.

While the environmental degradation brought about by salinisation caused a variety of social conflicts between rural communities about access to water and 'rights' to pollute rivers, and undermined many farmers' productive base, its story is also one of hope and self-organisation. Concerned people in Kerang and Shepparton founded research farms and action committees that collaborated with government departments to develop ways of farming in a saline environment and encourage environmental awareness. After the Victorian government launched a long-term strategy in 1988, this brought about some success. However, the decisive event was the 'Millennium Drought', from 1996 to 2010, which drastically reduced the water table levels and brought the GMID a reprieve from salinisation.

Therefore, while this story is instructive to study environment–society interactions during a time of degradation, it also vividly shows how the natural world shapes the conditions under which humans act, even in a highly modified, anthropogenic environment.

Keywords: salinity, water, irrigation, Murray–Darling Basin, Victoria, Australia

Map 1: The Goulburn–Murray Irrigation District in the Murray–Darling Basin.

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The transformative drive of salinisation

News about Australia's Murray–Darling Basin (MDB) is usually worrying. In 2019 a South Australian Royal Commission report was unequivocal about the peril the region is in: '[T]he Basin is in danger of being run down ... The threat of its degradation being irreversible is greater than ever. Climate change, alone, has that clear potential. Our exploitation of its water resources magnifies that threat'.¹ Consequently, the conflicts about the future of the basin have been intense, recently prompting the Australian *Guardian* to call them 'Water Wars'. Competing interests from states, rural communities, farmers, native title holders, the environment and coastal metropolises repeatedly clash over the question of how to manage the MDB in a future that, in all likelihood, will be marked by diminishing water resources and widespread degradation.² Against this backdrop, the future of its rural communities is set on change.³ In the past century, a different issue was transforming the basin's communities—salinisation of soils and water, dubbed 'Victoria's and arguably Australia's greatest environmental threat' by the Victorian Government in 1987.⁴ Paradoxically, the problem then was too much water. The MDB is a naturally saline environment with very little capacity to purge itself of salt and sediments. Water, applied in excessive quantities, released salt already in the soil or brought new salt onto the land. This, in significant concentrations, poisoned plants and reduced agricultural production. At its worst, it rendered farmland useless for production, leaving a barren land covered with a salt crust. Salinisation caused loss of habitat for animals and plants in streams, wetlands and lakes. The problem was partly caused by land clearing and the replacement of native perennial vegetation with introduced annual crops. However, it was predominantly linked to excessive water use by irrigators, which led to rising water tables.⁵ Its history is an instructive case about environment–society interactions during a time of environmental degradation. It also shows that, even in a highly modified, anthropogenic environment, the natural world shapes the conditions under which humans act. This can be vividly studied by example of the Goulburn–Murray Irrigation District (GMID), which is regarded as Australia's 'food bowl': the country's largest irrigation district. It supports a wide range of agricultural commodities such as dairy, cropping, horticulture, beef

1 B. Walker, *Murray–Darling Basin Royal Commission Report* (Adelaide: Government of South Australia, 2019), 35.

2 A. Davies, 'Water wars: Will politics destroy the Murray–Darling Basin plan—and the river System itself?', *The Guardian* (Australia), 13 December 2019.

3 Murray–Darling Basin Authority, *Guide to the Proposed Basin Plan. Appendix C: Goulburn–Murray Community Profile* (Canberra: Murray–Darling Basin Authority, 2010), 780–1, 805–6; Murray–Darling Basin Authority, *Basin Plan Evaluation 2017* (Canberra: Murray–Darling Basin Authority, Murray–Darling Basin Authority, 2017), 21.

4 Government of Victoria, *Salt Action: Joint Action. Victoria's Strategy for Managing Land and Water Salinity* (Melbourne: Government of Victoria, 1987), 5.

5 P. Crabb, *Murray–Darling Basin Resources* (Canberra: Murray Darling Basin Commission, 1997), 150; D. Connell, *Water Politics in the Murray–Darling Basin* (Leichhardt: Federation Press, 2017), 18; A. Young, *Environmental Change in Australia since 1788*, second edition (Melbourne: Oxford University Press, 2004), 46–54.

and sheep.⁶ The district sits in the south-west of the MDB, on Victoria's northern fringe. Its major towns are Shepparton, Swan Hill and Echuca, but there are important smaller ones, notably Kerang, Cohuna and Pyramid Hill. In 2010 it had a population of about 134,000 people and around 12,600 farm businesses.⁷ The GMID was formed in 1959 by the amalgamation of 20 irrigation districts, some of which had been established as far back as 1886.⁸ Historically, it has been divided into the Kerang region in the west and the Shepparton region in the east. Both regions share similarities, as the whole area is prone to salinisation due to its geological nature. Its underlying sediments contain saline deposits from ancestral rivers and, partly, an ancient sea. Salts are liberated through the decomposition of bedrock in the headwaters of the streams. However, there are important differences. For Shepparton, salinity was not a major problem until the early 1970s because, generally, its groundwater is not saline. By contrast, the Kerang region was renowned as 'the home of salinity', having experienced salinisation as early as the 1890s due to its highly saline soils.⁹ What linked the regions together was the Murray River, which still is a lifeline to both communities. They shared many of the same experiences with salinisation but, given their different environmental conditions, their stories also markedly differed. Anthropogenic salinisation has a long history, its first occurrence in Victoria having been reported as early as 1853.¹⁰ From then, its severity steadily increased. After 1945 it escalated, gradually turning it from an obscure matter into a high-profile environmental issue. This ongoing catastrophe caused intensive conflicts between the communities of the GMID about natural resources and pollution. It led to widespread anxiety about the future in rural communities. Many streams and wetlands became hypersaline or were turned into evaporation basins for drainage water. The social fabric of smaller towns disintegrated. However, the district's communities, in collaboration with government agencies, organised themselves into research farms and action committees. They developed ways of farming in a saline environment, put pressure on policy makers and encouraged environmental awareness. After decades of degradation, the Victorian Government took over these efforts with a long-term strategy in 1988. Its initial successes, however, have been eclipsed by the impact of the 'Millennium Drought', from 1996 to mid-2010, which drastically reduced salinisation problems. Therefore, the history of salinisation is a look back at an environmental hazard that has lost its immediate

6 Murray–Darling Basin Authority, *Guide*, 779; Goulburn–Broken Catchment Management Authority, *Regional Irrigated Land and Water Use Mapping in the Goulburn–Murray Irrigation District. Executive Summary* (Shepparton: State of Victoria, Murray–Darling Basin Authority, 2017), 1.

7 Murray–Darling Basin Authority, *Guide*, 779, 802.

8 A. G. Robertson, 'Report on Goulburn Murray Irrigation District Inquiry' [unpublished] (1977), 6.

9 G. O. Jones, 'We've done something about salt', *Northern Times* (Kerang), 1 March 1988; Gutteridge, Haskins & Davey Ltd, *Murray Valley Salinity Investigation*, vol. 1: *The Report* (Canberra: River Murray Commission, 1970), 226–9, 273–5; Gutteridge, Haskins & Davey Ltd, *Murray Valley Salinity Investigation: A Summary* (Canberra: River Murray Commission, 1970), 4–8.

10 P. Russ, *The Salt Traders: A History of Salinity in Victoria* (East Melbourne: Department of the Premier and Cabinet, State of Victoria, 1995), 31–2.

urgency. However, it provides an instructive case of the transformations induced in the MDB's rural communities by environmental degradation. Given the uncertain future of the basin, environmental history proves to be informative for what could be ahead.

Map 2: The Goulburn–Murray Irrigation District in 1967.

Source: State Rivers and Water Supply Collection, State Library of Victoria.

1. Too much water: The dialectic of environmental security

The hydrology of the MDB has been modified for thousands of years. For example, Aboriginal peoples on the Victorian Northern Plains, the Barapa Barapa, the Wemba Wemba, Dja Dja Wurrung, Ngurai-illamwurrung and the Yorta Yorta, built granite

wells and channels to redirect flood waters through weirs made of stakes to catch fish.¹¹ However, its ‘developed’ character of today is chiefly a product of the twentieth century. The basin, as the 2019 Royal Commission put it, is in a ‘highly engineered state of affairs’ in which its rivers have ‘ineradicable artificial qualities’ that make it virtually impossible to return to a ‘pre-development’ state.¹² This is especially true for the Murray. According to Emily O’Gorman, it has been transformed into a ‘regulated river’. Dams were built to ‘control river flow, ensuring there was water in the river at the right times for irrigated agriculture ... and to minimise the effects of drought’.¹³ In the GMID, the development of an irrigation system, between 1900 and 1950, with a vast network of channels to carry water from reservoirs to irrigation farms has created what Peter Davies and Susan Lawrence have called ‘a new Cartesian geometry’, overlaying and partially replacing natural curves of waterways.¹⁴ Irrigation was depicted as a response of human ingenuity to the continent’s climatic variability. According to its proponents, Australia did not have a shortage of water but rather a maldistribution. If water could be stored and distributed when needed, it would even out the seasons and convert arid land into productive farms and orchards.¹⁵ ‘Water Dreaming’, as Michael Cathcart has called it, emerged as a popular ideology in the twentieth century. It hailed the capacity of hydro-engineering as a means of nation building in the inland to realise the vision of a closely populated white Australia. By transforming the ostensibly ‘empty’ continent, deemed *terra nullius*, into a ‘civilised’ landscape, white Australians would be able to lay claim to Country.¹⁶ Some important results were government-backed closer and, after the world wars, soldier settlement schemes that relied on irrigation.¹⁷ Irrigation development began in the Australian colonies of New South Wales, South Australia and Victoria in the 1860s and 1870s. Its early history was plagued by lack of capital and expertise.¹⁸ This was only redeemed when rural water supply was centralised in powerful public agencies in 1906 with the founding of the Victorian State Rivers and Water Supply Commission (SRWSC) along with other constructing authorities and a supervising River Murray Commission (RMC).¹⁹ Tasked with rural development, they set about

11 R. Ballinger, *An Inch of Rain: A Water History of Northern Victoria* (North Melbourne: Australian Scholarly Publishing, 2012), 6–7.

12 Walker, *Report*, 13.

13 E. O’Gorman, *Flood Country: An Environmental History of the Murray–Darling Basin* (Collingwood: CSIRO Publishing, 2012), 137, doi.org/10.1071/9780643106659.

14 P. Davies and S. Lawrence, ‘Engineered landscapes of the southern Murray–Darling Basin: Anthropocene archaeology in Australia’, *Anthropocene Review* 6, no. 3 (2019): 190, doi.org/10.1177/2053019619872826; Murray–Darling Basin Authority, *Guide*, 781, 784.

15 D. Garden, *Australia, New Zealand, and the Pacific: An Environmental History* (Santa Barbara, CA: ABC-CLIO, 2005), 110.

16 M. Cathcart, *The Water Dreamers: The Remarkable History of Our Dry Continent* (Melbourne: Text Publishing, 2009), 199, 201, 210–11, 231, 247.

17 O’Gorman, *Flood Country*, 137.

18 Garden, *Australia*, 110; J. M. Powell, *Watering the Garden State: Water, Land and Community in Victoria 1834–1988* (Sydney: Allen & Unwin, 1989), 101–4.

19 Powell, *Garden State*, 142–7.

a concerted effort to ‘canalise’ the river, ‘to make it into a channel to support water supply from dams to irrigation settlements’.²⁰ Between 1915 and 1974, Lake Victoria reservoir, Hume Dam, the Snowy Mountains Scheme, five barrages on Lake Alexandrina, 13 locks on the Murray, the Yarrawonga Weir with Lake Mulwala, and other works were completed. The Murray was transformed materially and conceptually. Previously, it had been regarded as a ‘natural’, and therefore erratic, entity with its own dynamic. However, as early as 1939, the river’s flow had been substantially modified by the operation of the Hume Dam. The RMC could usually determine when water would flow in the river, and how much.²¹ Subsequently, the ‘seasonal flows of the River Murray were reversed for irrigation needs, and eastward flowing rivers were turned westward by the Snowy Mountains Scheme’. During the 1950s, the period of the most dramatic environmental interventions, it came to be perceived as an engineered system, under control and monitoring by centralised government authorities and experts. To use O’Gorman’s term, these, in turn, assumed responsibility to deliver ‘environmental security’ to its users.²² However, this quest for security produced its own dialectic. From the very beginning, irrigation schemes had struggled with substantial water losses through evaporation and leakage.²³ The result was salinisation. In 1916 a Victorian Royal Commission reported that, in Cohuna, ‘due to an immensely greater volume of water being put upon the land than it was accustomed to ... the water table rose, and the alkali being a deadly poison to plant life, desolated the areas affected’.²⁴ Subsequently, the construction of more engineering works made available more water for irrigation, which flowed unmeasured and unrestricted.²⁵ By the 1930s a permanent rise in the water table had occurred in the irrigation districts of Northern Victoria. In stark contrast to the offensive in the development of delivery works, only essential drainage measures were undertaken, because the SRWSC usually considered them too expensive.²⁶ After 1945 development accelerated like never before. Driven by favourable economic conditions and political imperatives, it embarked on an ambitious building program that drastically increased the amount of water available to irrigators. Thanks to a major upgrade to the Eildon Dam in 1956, irrigators in the GMID enjoyed an effectively unlimited supply. There was a 32 per cent increase

20 E. O’Gorman, ‘Unnatural river, unnatural floods? Regulation and responsibility on the Murray River in the 1950s’, *Australian Humanities Review* 48 (2010), 91, doi.org/10.22459/AHR.48.2010.09.

21 O’Gorman, *Flood Country*, 137–8, 143; P. Sinclair, *The Murray: A River and its People* (Carlton South: Melbourne University Press, 2001), 68–9; O’Gorman, ‘Unnatural river, unnatural floods?’.

22 O’Gorman, *Flood Country*, 137.

23 Powell, *Garden State*, 101–4.

24 J. G. Johnstone et al., ‘Final Report from the Royal Commission on Closer Settlement as to the Working of the Closer Settlement Acts in the Irrigable Districts and a General Review of the Finances of Closer Settlement together with Appendices’, *Victorian Parliamentary Papers* no. 29 (1916), 28.

25 G. O. Jones et al., *Fifty Years of Achievement: Department of Agriculture and Rural Affairs, Kerang 1989* (Kerang: Department of Agriculture and Rural Affairs, 1989), 8; Gutteridge, Haskins & Davey Ltd, *Report*, 229.

26 Ballinger, *An Inch of Rain*, 132; N. Barr and J. Cary, *Greening a Brown Land: The Australian Search for Sustainable Land Use* (South Melbourne: Macmillan, 1992), 223; Russ, *Salt Traders*, 96.

in the irrigated area in the 1950s.²⁷ However, only about 25 per cent of the water was used for growing crops. The remaining 75 per cent was lost by seepage from reservoirs and channels, evaporation and excessive application by farmers.²⁸ Notwithstanding improvements, consulting engineers estimated that, in the Kerang region, a total of 415,000 acre-feet (51.2 million m³) were lost every year in the mid-1960s—substantially more than the capacity of the old Eildon reservoir.²⁹ With each drought, the next storage reservoir was built with more capacity to hold water in order to achieve a greater system capacity that would allow for an extension of the water supply to more Victorian farmers. ‘Abnormal’ seasonal conditions were compensated with more water releases.³⁰ Salinisation problems were well known in Kerang, Cohuna and Swan Hill. Productivity losses had reached 50 per cent by 1950 and large tracts of farmland were salinised, causing considerable economic loss to many farmers. Just as in the Shepparton area, floods in the years between 1951 and 1956 put good land out of production by further raising the water table.³¹ While the correlation between salinisation and high water tables had long been known, drainage was still not keeping pace with irrigation development. If the SRWSC installed drains, it preferred to drain areas with high agricultural value, like the intensive horticultural districts around Swan Hill and Shepparton, rather than those with poor soils and low yields, like in Kerang.³² As a result, Shepparton did have an extensive drainage system by the mid-1960s and another had been commenced in the Swan Hill area, while the remaining regions remained undrained and had rapidly increasing salinisation problems.³³ Salinisation was not a high priority for the SRWSC. This only changed when its urgency for the GMID’s communities escalated due to the floods of the early 1970s. February of 1973 brought heavy rains to northern Victoria, which continued through autumn.³⁴ In August the Avoca, Loddon, Campaspe, Goulburn and Broken rivers went into prolonged flooding. Pyramid Creek, the Little Murray, the Lower Loddon and the Kerang Lakes were in flood, and the urban areas of Kerang were threatened by the rising waters after record rainfalls.³⁵ Another period of floods followed in May 1974, which was particularly severe in the Ovens and Goulburn rivers. Urban residential areas in Shepparton, Mooroopna, Wangaratta, Seymour and Nathalia suffered major flooding. The heavy rains promoted excessive groundwater recharge, in turn

27 Powell, *Garden State*, 222, 225, 233–5; State Rivers and Water Supply Commission, *Fifty-Second Annual Report. 1956–57* (Melbourne: Government Printer, 1957), 7; Murray–Darling Basin Authority, *Guide*, 783.

28 State Rivers and Water Supply Commission, *Fifty-Fourth Annual Report. 1958–59* (Melbourne: Government Printer, 1959), 9.

29 Gutteridge, Haskins & Davey Ltd, *Report*, 241–4; Russ, *Salt Traders*, 76–7.

30 Russ, *Salt Traders*, 78.

31 Ibid., 96–100; Jones et al., *Fifty Years*, 3–4, 8–9; Gutteridge, Haskins & Davey Ltd, *Report*, 231.

32 Gutteridge, Haskins & Davey Ltd, *Report*, 251; Russ, *Salt Traders*, 89.

33 Gutteridge, Haskins & Davey Ltd, *Report*, 251, 231, 286.

34 State Rivers and Water Supply Commission, *67th Annual Report 1972–73* (Melbourne: Government Printer, 1974), 10–11.

35 Anonymous, ‘Record wet’, *Northern Times*, 11 January 1974; State Rivers and Water Supply Commission, *68th Annual Report 1973–74* (Melbourne: Government Printer, 1974), 14.

raising water tables throughout the GMID.³⁶ In areas without drainage or proper land layout, the water stayed around for a long time even after the rains had stopped, which reduced pasture production through waterlogging.³⁷ After the floods, an estimated 75 per cent of the Kerang region had shallow water tables.³⁸ Shepparton, for the first time, had serious salinisation and water table problems. About 300,000 peach trees were destroyed by waterlogging, and symptoms of salinisation occurred in orchards and on pastoral properties. About 46 per cent of the area now suffered from shallow water tables.³⁹ By 1974, the dialectic of environmental security was complete. More water was being used by irrigators than ever before. With insufficient drainage, the floods had escalated the situation. Salinisation had become a major issue that received widespread attention. Agitation in the GMID's communities reached new heights and led to increased efforts to alleviate the situation. The following years would see an intensification of the conflicts that salinisation entailed. The pursuit of 'environmental security' had been subverted by its own means and the dynamics of the MDB's natural conditions. This meant that the future of GMID would be marked by environmental *insecurity*.

2. Communities in conflict

In the first instance, the loss of security prompted a new approach to salinisation and waterlogging. The fact that Victoria's valuable rural industries in the Shepparton region were now under threat did more than anything to bring this about. The region boasted 20 per cent of the Australia's horticultural and 11 per cent of its dairy production. By comparison, the Kerang region claimed only 2.5 per cent of Australia's dairy and 3.9 per cent of its wine production.⁴⁰ Consequently, when the SRWSC tabled a 10-year strategy in May 1975 its focus was to solve Shepparton's problems. Its '40 Million Dollar Plan' (more than 1 billion Australian dollars in current values) was based on economic cost-benefit analyses and environmental considerations.⁴¹ It envisaged upgrades to existing evaporation basins and salt interception schemes, and an extensive surface drainage scheme. As Shepparton had significantly lower groundwater salinities than the Kerang region, it also planned for reuse schemes for saline drainage water.⁴² By contrast, the plans for the Kerang region

36 State Rivers and Water Supply Commission, *68th Annual Report*, 6, 15.

37 Anonymous, 'Waterlogging drops pasture production', *The Guardian* (Swan Hill), 25 July 1973.

38 State Rivers and Water Supply Commission, *Salinity Control and Drainage: A Strategy for Northern Victorian Irrigation and River Murray Quality* (Melbourne: State Rivers and Water Supply Commission, 1975), 47–8, 177.

39 Ibid., 45–7, 51, 81–82; State Rivers and Water Supply Commission, *68th Annual Report*, 15.

40 State Rivers and Water Supply Commission, *Salinity*, 23–4.

41 Ibid., 1; Anonymous, 'Spend \$40m. or suffer', *Northern Times*, 1 August 1975. Current value calculated using D. Hutchinson and F. Ploeckl, 'Five ways to compute the relative value of Australian amounts, 1828 to the present', www.measuringworth.com/australiacompare, accessed 3 September 2021.

42 State Rivers and Water Supply Commission, *Salinity*, 1–6; Anonymous, 'Salt answers on the farm?' *Northern Times*, 21 September 1976.

were largely agricultural. The strategy did not include engineering solutions, like completing its surface drainage scheme, because this was deemed not economically justifiable. Kerang would, however, receive the bulk of the envisaged aid to augment extension services and financial assistance for better farm management.⁴³ Non-intervention would mean letting a 'high-quality artificial environment' degrade. The consequences would go far beyond a mere decline in production. They would include a disruption of economic and social structures and the need to retrain and resettle displaced farmers.⁴⁴ It was due to this threat, combined with different priorities for the regions of the GMID, that anxieties and conflicts erupted before the Parliamentary Public Works Committee on salinity, which met between 1975 and 1984. While its primary aim was to evaluate the SRWSC's strategy, it inevitably also became a forum in which the different views on salinisation clashed.⁴⁵ Kerang and Shepparton had become rival political camps. Those speaking on behalf of the Kerang region made their statements from a position of vulnerability, having 'lived with much greater problems of salinity and waterlogging for some 50–55 years'. They felt disadvantaged compared to the Shepparton region in terms of economic priority and political muscle.⁴⁶ '[C]oncerned by the lack of concern by the Commission', speakers from the region were eager to stress the existential threat that salinisation posed to their livelihoods and that the window of opportunity to turn the situation around was closing fast.⁴⁷ Donald Andrew Leed from Pyramid Hill offered graphic insights into the consequences of salinisation in his district:

Our pastures as we knew them 15 years ago are very isolated. Whole clumps of trees have died, or are badly affected ... Our roads suffer to such a state that our vehicles depreciate at a higher rate than normal. Retailers do not like to mention our district from which they come. Our heritage is being corroded away, the very foundations of our homes are being eaten away by the salt, not to mention our bank balances and the problems connected with survival ... neighboring townspeople refer to Pyramid Hill District as the 'desert'.⁴⁸

Mick Clarke, an Albury grazier, made his case with moral fervour when he argued that the SRWSC's strategy dismissed the Kerang region 'as not worth saving in pure economic terms'. He challenged the committee: 'Unless each of you is brave enough to recommend writing off Kerang and be prepared to accept the economic and social chaos of such a decision, then you must reject the \$40 million plan

43 State Rivers and Water Supply Commission, *Salinity*, 4, 47–8.

44 *Ibid.*, 9.

45 Russ, *Salt Traders*, 150.

46 Parliamentary Public Works Committee at Kerang, *Gynlais Oughton Jones*, 13 July 1976. 241, pp. 64–131, 90–91. Public Record Office Victoria.

47 Parliamentary Public Works Committee at Kerang, *Donald Andrew Leed*, 27 July 1978. 11559, 24.07.27 PT4, 632. Public Record Office Victoria.

48 Parliamentary Public Works Committee at Kerang, *Donald Andrew Leed*, 13 July 1976. 241, pp. 64–131. Public Record Office Victoria.

... as inadequate'.⁴⁹ The contributions from witnesses making the case for the Shepparton region reflected that their positions were significantly different, as salinisation had only 'reared its head all of a sudden'.⁵⁰ This, however, did not result in a rhetoric that was less drastic. An orchardist from the region, Ivan Roland Routley, warned the committee that '[t]ime is running out ... the problem will certainly become worse—a disaster in the making'. The 'threat' from the sudden rise of the water tables and 'subsequent salting is serious and insidious for the whole area'. Despite this, during the cross-examination he conceded that '[s]alinity as such is only just appearing as a real problem'. A Cobram shire councillor claimed not to have been greatly perplexed or worried by salinisation to date. Substantial losses of peaches in 1973–74 had been due to high water tables, when surplus water had been lying around for months, rather than salinity. The area's main problem was waterlogging. Drainage was a means to pre-empt salinisation 'before it is too late to save the most productive horticultural area in the State'.⁵¹ Upstream Shepparton was accused of being a polluter, which was hurting Kerang downstream. Speakers in favour of Kerang criticised the fact that, due to the increased drainage measures for Shepparton, their region would, in turn, receive more saline water via the Murray. According to Gyn Jones and Des Thomas, an irrigation officer and a conservationist from Kerang, respectively, '[o]ur already poorly drained area cannot tolerate the long-term effects of being a major sink for salt from other areas'.⁵² At a meeting called by the Ultima and District Dryland Farmers League, speakers denounced the SRWSC's plans as a major threat to farming in the Mallee, as they would increase the risk of salting their farmland. They were simply 'intended to get Shepparton out of a sticky problem and would do nothing for the Kerang region'.⁵³ In Shepparton, these allegations were dismissed. Leon Heath, a farmer from Mooroopna, insisted that, due to its economic value, as 'a most logical and responsible objective' his region be protected first. He candidly declared that, given financial limitations, there had to be some casualties. Heath suggested that, in the long term, there should be consideration about whether the Kerang region should be given up as a means of preserving the Murray.⁵⁴ 'I do not think that irrigation water should be supplied to people who abuse it and cause problems to other people, and the community, and

49 Parliamentary Public Works Committee at Melbourne, *Ernest Edward Clarke*, 4 July 1978. 11559, 24.07.27 PT4, 834. Public Record Office Victoria.

50 Parliamentary Public Works Committee at Shepparton, *Eric Merrigan*, 14 July 1976. 11559, 24.07.27 PT1, 149A. Public Record Office Victoria.

51 Parliamentary Public Works Committee at Shepparton, *Ivan Roland Routley*, 8 February 1977. 11559, 24.07.27 PT2, 279–280B. Public Record Office Victoria; Parliamentary Public Works Committee at Melbourne, *Philip Andrew Pullar*, 29 September 1976. PROV, 11559, 24.07.27 PT1, 161. Public Record Office Victoria; Parliamentary Public Works Committee at Melbourne, *Ivan Roland Routley*, 29 September 1976, PROV, 11559, 24.07.27 PT1, 198. Public Record Office Victoria.

52 Parliamentary Public Works Committee at Kerang, *Jones*, 80, 87.

53 Anonymous, 'Dry farmers \$3600 for anti-salt case', *Northern Times*, 15 August 1975; Anonymous, 'Ultima is opposing channel', *Northern Times*, 16 July 1976.

54 Parliamentary Public Works Committee at Melbourne, *Leon G. Heath*. 11559, 24.07.27 PT4, 13.12.1978, 1057–8; 1066/1067–9. Public Record Office Victoria.

perhaps the nation.⁵⁵ He referred to the fact that the salt loads in the Murray River increased substantially downstream, as the river collected more and more saline effluent from the irrigation areas around Kerang and Swan Hill. Comparatively, the Shepparton region's drainage outfall was a small addition to the Murray's salinity. The real problem was that irrigation was allowed in an area with a highly saline environment. In other words, the true polluter was the Kerang region.⁵⁶

3. Environmental and social degradation

While salinisation exacerbated existing resource conflicts, it caused widespread environmental and social degradation throughout the GMID. The former is perhaps best exemplified by the fate of Barr Creek. This stream rises around Leitchville, enters the Loddon River near Swan Hill, and its waters, ultimately, reach the Murray. At the beginning of the twentieth century, its catchment was a natural, shallow depression on the Murray floodplain, with swamps and lagoons. Fresh water at the upper end supplied irrigation water. Many species of native fish thrived, and its banks were well endowed with red gums, black box trees and herbage. In the 1920s, however, the creek became a drain for irrigation farmers. In the early 1930s the SRWSC built deep surface drains in the Cohuna irrigation district and dredged the creek to increase its capacity—so deep, in fact, that it intercepted saline groundwater, which began entering the river. The salt pushed the fish out and soon killed the trees on the banks.⁵⁷ Barr Creek became the main collector drain for much of the Kerang region and the largest individual source of salt in the entire Murray Valley. Salinities in the creek varied widely, reaching a maximum of 20,000 parts per million (extremely saline water) in winter and a minimum of 500 parts per million in summer (medium saline water). Barr Creek contained a number of pools in which saline water accumulated in large quantities, which, if suddenly released by rain or a storm, could increase its salt load from the average of about 400 to as much as 3,000 tonnes of salt per day. When the drought of 1967–68 increased political attention to salinisation in the Murray, the Commonwealth Government funded a scheme to pump part of the creek's flows into a series of lakes to evaporate. This successfully reduced the amount of salt entering the Murray, with substantial improvements for the region and the users downstream. However, it did so at the price of sacrificing Lake Tutchewop. This was a former freshwater lake used for swimming and recreation that had become saline due to the increased level of saline groundwater. Now it was converted into an evaporation basin. Even after this intervention, Barr Creek, in the early 1980s, contributed 40 per cent of the annual saline inflows from

55 Parliamentary Public Works Committee at Melbourne, *Heath*, 1069.

56 *Ibid.*, 1957–9.

57 Russ, *Salt Traders*, 90–1; G. E. Hardwick, 'A historical report of the North Central Catchment Region' [unpublished] (Kerang, 1999), 11.

Victoria's irrigation areas into the Murray.⁵⁸ While Barr Creek and Lake Tutchewop are the most striking examples of degradation, there are many more. The Kerang Lakes Area, with its abundance of natural lakes and swamps, included valuable ecosystems that provided broad habitats for a wide diversity of species and abundant populations of native flora and fauna. By the late 1980s, however, saline intrusions, disposal of drainage water and isolation from natural flushing flows had caused massive salinity increases. In many wetlands, salinity levels were now more than a hundred times greater than before. This led to the extinction of many freshwater-dependent plant and animal species. Examples were lakes with such telling names as the Duck Lakes, Dry Lake, Long Lake and North Drainage Lake, which, previously fresh or brackish, had been turned into hypersaline environments supporting virtually no flora and fauna.⁵⁹

Figure 1: Lake Tutchewop, a former freshwater lake that was turned into an evaporation basin for saline water. Note the characteristic salt-tolerant vegetation, 4 August 2017.

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58 Gutteridge, Haskins & Davey Ltd, *Report*, 234; House of Representatives, *Victoria Grant (River Murray Salinity) Bill 1968. Second Reading. Speech. Wednesday, 1 May 1968*, 993; Department of National Development, *Salinity Reduction Projects*, 2–3; State Rivers and Water Supply Commission, *River Murray. Salinity Reduction—Barr Creek*. A1960, 1973/774, 1. National Archives of Australia; Salinity Committee, *Salt of the Earth: Final Report on the Causes, Effects and Control of Land and River Salinity in Victoria* (Melbourne: Government Printer, 1984), 22; 'Water quality for farm water supplies', last modified 2 March 2021, agriculture.vic.gov.au/farm-management/water/managing-dams/water-quality-for-farm-water-supplies, accessed 1 September 2021; Hardwick, 'A historical report', 11–12.

59 Kerang Lakes Area Working Group, *Communities in Partnership: Kerang Lakes Area Draft Salinity Management Plan* (Kerang: Kerang Lakes Area Working Group, 1992), 44.

By contrast, the social consequences of spreading salinisation are much more difficult to delineate. Sharman Stone, a sociologist born in Pyramid Hill, contended that '[m]ost of the rural population will have to adapt their life expectations to city living'. The communities in the salt-affected areas were 'at a critical stage in their struggle for continued existence' given the combination of falling produce prices and the land's declining productivity, forcing the 'farmers' sons to seek employment off the family property. The young man with a family cannot afford to work harder each year for ever diminishing returns'. Older farmers might stay in the district on reduced income. Hence, the communities experienced a process of depopulation, causing local churches, schools, sporting associations and businesses to fail, or reduce their activities. On the other hand, young and inexperienced farmers bought salt-affected properties, attracted by the land price and the appeal of irrigation. Many farms became absentee-owned. The existing social fabric of the area was dissolving.⁶⁰ While this assessment may have reflected an ideological commitment to what Don Aitkin has termed 'countrymindedness', postulating the intrinsic value of farming and rural life overall, Stone nonetheless rightly drew attention to the nexus of salinisation and social change.⁶¹ However, productivity losses were not uniform throughout the Kerang and Shepparton regions. Gyn Jones, speaking from his experience as an irrigation officer in Kerang, claimed that '[y]ou can drive along and find one place which is virtually an oasis, with a terrific production and carrying capacity. Quite often that particular farmer has got rid of the salt and is controlling it. Therefore, he obtains a great production'. By contrast, 'you can go through miles and miles of country where it is virtually impossible at the moment for farmers to survive ... with the burden of salinity, plus other economic problems'.⁶² The uncertainties involved were, therefore, overwhelming. According to a 1983 study by the consultants of ACIL Australia and others, salinity's social effects were 'perhaps among the least studied of all'.⁶³ Overall, the consultants' best approximation was that annual agricultural production losses due to salinisation amounted to AU\$6 million in irrigation areas, and \$3.1 to \$5.5 million in dryland areas. The loss of capital value was deemed to be about \$110 million and from \$17 to \$180 million, respectively. For the Kerang region, it was estimated that more than half of the irrigated area was suffering reduced or negligible agricultural production. Due to lower productivity and prices, the gross income of farmers on salt-affected properties was possibly often less than 50 per cent of comparable non-

60 Parliamentary Public Works Committee at Melbourne, *Sharman Nancy Stone*, 4 July 1978. 11559, 24.07.27 PT4. Public Record Office Victoria; S. N. Stone, 'The sociology of salinity in northern Victoria', *Water Talk* 44 (1980): 17–21.

61 D. Aitkin, "'Countrymindedness': The spread of an idea', *Australian Cultural History* 4 (1985): 35; G. Davison, 'Country life. The rise and decline of an Australian ideal', in *Struggle Country. The Rural Ideal in Twentieth Century Australia*, ed. G. Davison and M. Brodie (Melbourne: Monash University ePress, 2005).

62 Parliamentary Public Works Committee at Kerang, *Jones*, 92.

63 ACIL Australia et al., *Causes, Extent and Effects of Salinity in Victoria* (Melbourne: Salinity Committee, Victorian Parliament, 1983), 149, xiii.

salt affected ones.⁶⁴ A 1984 report estimated that Kerang's decrease in agricultural production was between 22 and 27 per cent, and Shepparton's 7 per cent, resulting in a combined loss of \$30 million a year. The flow-on effect on the community was deemed to be between \$45 and \$60 million.⁶⁵ The consultants, in principle, agreed with Stone's diagnosis, adding that farmers whose productivity was diminished by salinisation often commanded insufficient funds to carry out improvements required to ameliorate its effects. Salinisation required them to farm a greater area, while lower returns made it difficult to finance expansion or development—a fatal situation for many.⁶⁶ However, they objected to the uniformity of the economic and social multiplier effects of lower incomes for farmers that Stone had assumed for all salt-affected areas. Whereas she had accurately assessed the situation of small towns like Pyramid Hill (632 people in 1971), larger centres might have had a broad enough economic base to survive. For example, it could not be assumed that cities like Shepparton or Echuca would suffer a symmetrical depopulation due to salinity problems. Other factors, such as the terms of trade of the relevant agricultural industries, the mix of agricultural production and the size of each town, would determine the net effect. Shepparton, a case in point, had continued to grow despite an extended period of declining canning fruit incomes, which were offset by buoyant conditions for the dairy industry. Shepparton City grew from a population of 10,848 to 17,523 from 1957 to 1966, reaching 24,430 people in 1981. Kerang had largely maintained its population of about 4,000 from 1970 to 1986, despite the growing extent of salinisation. Swan Hill's population had grown from 7,700 to 8,831 over the same period.⁶⁷ A causal nexus between salinisation, economic degradation and the resulting decline of irrigation communities could not be established. However, the crisis transcended economics. It encompassed the 'anxiety associated with a problem that is often not easily explained, is inequitably distributed in the community, and appears to be inexorably growing'.⁶⁸ Furthermore, it was extremely difficult, if not impossible, to quantify the real cost of a problem that included such things as future tourist or economic potential, aesthetic judgements, estimations of human and community 'worth', levels of mental health and human anguish, the devaluing of a landscape with dead and dying trees, and the loss of freshwater fish, wild flowers and habitats of fauna. Who could quantify the mental and physical stress experienced by those who lived with the declining productivity and altered landscape induced by salinisation?⁶⁹

64 Ibid., 85, 133.

65 Salinity Committee, *Salt of the Earth*, xviii, 70–2.

66 ACIL Australia et al., *Salinity*, 134.

67 Ibid., 150–1; State Rivers and Water Supply Commission, *Salinity*, 25; J. Cary and N. Barr, 'The Kerang Lakes Area Management Project: Social profile', in *Kerang Lakes Area Draft Salinity Management Plan. Background Papers*, vol. 1, ed. Salt Action Victoria (Melbourne: Rural Water Commission, 1989), 5, 7–8, 11; Goulburn–Broken Region Salinity Pilot Program Advisory Council, *Draft Shepparton Land and Water Salinity Management Plan* (Shepparton: Rural Affairs Conservation and Environment Committee of Cabinet, 1989), 18–19.

68 State Rivers and Water Supply Commission, *Salinity*, 97.

69 Anonymous, 'Salinity multi-faceted problem', *Northern Times*, 15 September 1984.

4. Activism and self-help

While the deliberations over the best course of action dragged on, salinisation problems were still increasing in scope. In the final report of the Victorian Parliament's salinity inquiry, published in 1984, it was estimated that about 2,400 km² of land in the state was observably damaged by salt, 1,400 km² of which lay in the GMID. Another 4,000 km² were found to be salt-prone.⁷⁰ For the Shepparton region, it was estimated that half of the irrigated land had water tables at or near the critical level of 2 metres below the surface. Unless further control measures were taken, a major expansion was anticipated within the next decade. As for Kerang, a precarious stability had been achieved. Whereas about 72 per cent of the region was underlain by shallow water tables, the water inputs and outputs appeared to balance, and the water table to be in a state of 'dynamic equilibrium', in which evapotranspiration losses balanced accessions, at about 1 metre below the surface.⁷¹ This was due to two factors: firstly, the Commonwealth-funded salinity reduction project at Barr Creek, installed in 1968, removed four to five times the annual salt increment of 50,000 tonnes brought into the region by irrigation water.⁷² Secondly, people in the GMID's communities had organised to mitigate salinisation long ago. These local initiatives were born of a combination of community self-help and collaboration with governments. The latter provided expertise and, importantly, funds. Therefore, it would be mistaken to assume that they were examples of 'yeomen'-like farmer self-sufficiency in the spirit of Australian agrarianism. However, they did prove crucial for coming to terms with salinisation by involving the people in the GMID's communities and providing local expertise and impetus.⁷³ Early initiatives had begun in the drought year of 1939. Alan Morgan, an agricultural researcher at the State Research Farm at Werribee, had been sent to Kerang to head the newly established Kerang Agricultural Centre. 'Morgy' had worked with farmers to set up experimental plots on salt-affected land to investigate treatment and improvement of soils.⁷⁴ Furthermore, in 1954 and 1956, two community-owned research farms had been founded in Swan Hill and Kerang whose mission was to work in conjunction with farmers and government departments on the districts' problems—chiefly salinisation.⁷⁵ These strove to channel their findings to the community and the government experts.⁷⁶ Kerang's farm was located on the Murray Valley Highway

70 Salinity Committee, *Salt of the Earth*, 22–30, 40.

71 Ibid., xvii, 52, 60; ACIL Australia et al., *Salinity*, xxi.

72 Gutteridge, Haskins & Davey Ltd, *Report*, 251.

73 On Australian agrarianism, see Barr and Cary, *Greening*, 206–11; M. Lake, *The Limits of Hope: Soldier Settlement in Victoria 1915–1938* (Melbourne and New York: Oxford University Press, 1987), 11–24.

74 Jones et al., *Fifty Years*, 9; State Rivers and Water Supply Commission, *Experimental plots*, 17 October 1939. 6008, 57/20441. Public Record Office Victoria; Russ, *Salt Traders*, 97.

75 'Enthusiastic support for research farm', *The Guardian* (Swan Hill), 16 August 1954; 'Research farm at Kerang', *The Age*, 20 April 1956.

76 Jones et al., *Fifty Years*, 12–13.

en route to Cohuna on a partly salted block with characteristic soil types.⁷⁷ In the following decades farmers, partly with their own money, partly with government assistance, invested huge sums into on-farm improvements, like better land forming to promote water run-off, installation of subsurface drainage schemes, and more efficient irrigation systems.⁷⁸ However, by 1976, a veritable network of community activists had developed. Now, there was not just a technical, but also a political side to self-help. A new mode of community organisation had developed, the 'Salinity Action Group'. The first had been founded in Mooroopna at a meeting of representatives from shires, fruit grower and dairy farmer organisations, and the fruit and dairying industry on 13 June 1974—the 'Goulburn Irrigation Region Drainage Action Committee' (GIRDAC). Its initial goal was to alleviate the immediate threat to the Shepparton region's orchards after the floods, by groundwater pumping and drainage. More broadly, it wanted to promote a comprehensive drainage scheme and a salinity control program for the region.⁷⁹ A similar effort in the Kerang region came to fruition only two years later, when, in February 1976, the 'Kerang Irrigation Region Salinity Action Committee' (KIRSAC) was founded.⁸⁰ By the late 1970s, there were about 30 organisations of this type in Victoria.⁸¹ These groups successfully established themselves as lobby organisations with access to ministers, politicians and officials. They commented on policy and contributed regional expertise. Finally, they worked to educate their communities about salinisation. Their primary aim was to achieve salinity control through a combination of technical means, allocation of funds, and better co-operation between the agencies involved in water management. This, they felt, could only be accomplished with the resources and authority of the governments whose agencies had engineered the anthropogenic 'working landscape' that was the MDB, and continued to administer it.⁸² They are aptly understood as conservation groups, as they were receptive to the new discourses about 'sustainable development' and adopted the language of popular ecology. By contrast, their campaigning style was that of the 'old' conservationism, relying on quiet persuasion rather than open protest or even militancy, which were signatures of the 'new'

77 'Research farm site to be bought', *Kerang New Times*, 8 June 1956; 'Proposed site for research farm', *Kerang New Times*, 4 May 1956.

78 G. O. Jones, 'Salinity spread is a reminder to "lift our performance"', *Northern Times*, 27 June 1986; Salinity Committee, *Salt of the Earth*, 82–6, 115–16; Goulburn–Broken Region Salinity Pilot Program Advisory Council, *Plan*, 14.

79 E. M. Jackson to Minister of Water Supply, 3 June 1974. 6008, 74/20650. Public Record Office Victoria; D. J. Constable, 'Note for file', 19 June 1974. 6008, 74/20650. Public Record Office Victoria.

80 Anonymous, 'Community call to fight the salinity', *Northern Times*, 2 March 1976.

81 ACIL Australia et al., *Salinity*, 153.

82 E. M. Jackson to Minister of Water Supply; E. M. Jackson to Secretary, State Rivers and Water Supply Commission, 're: Press tour, Kerang region, 18th–20th July', 8 July 1978. 6008, 74/693. Public Record Office Victoria.

environmentalism.⁸³ For Gyn Jones, one of KIRSAC's protagonists, salinisation was a symptom of the 'mismanagement of our environment' that could not be solved by technical means alone. What was needed was a combination of improved agricultural techniques, government assistance and a sense of stewardship for the environment.⁸⁴ However, Salinity Action Groups are not properly understood as proponents of the power of 'civil society' in conservation issues. They not only focused their activities on governments but also were closely intertwined with them. This becomes plain when considering that most of their leading personnel were either current or former employees of government agencies concerned with land and water issues. Gyn Jones, to name just one example, was the senior irrigation officer at the Department of Agriculture for north-west Victoria. He blended his occupation with his activism, promoting sustainable land and water use to irrigators and acting as KIRSAC's mouthpiece through his weekly column 'Gun shots' in Kerang's local newspaper.⁸⁵ Furthermore, as the case of GIRDAC illustrates, the groups held strong ties to local industry and interests. It is, therefore, not surprising that their rural activism always retained a certain parochial impetus, being primarily concerned with the welfare of their own communities and land. Consequently, while both groups strove for the same goal, they also competed with each other for public money and about priorities for the problems of their respective regions.⁸⁶ GIRDAC achieved an initial success by convincing the Victorian Government to allocate \$830,000 for groundwater pumps and surface drainage works.⁸⁷ Consequently, KIRSAC picked up the ball and made its first major commitment, a coordination of submissions from the Kerang region to the parliamentary inquiry on salinity to establish the social and economic viability of the region in order to gain priority regarding salinity reclamation works.⁸⁸ Both groups kept a close watch on the issue and became sought after as experts for local and regional knowledge on environmental conditions and opinion, who were capable of aggregating many interests from their respective communities.⁸⁹ In KIRSAC's view, awareness of environmental problems was an 'essential first' in any permanent salinity reclamation program. But without

83 E. M. Jackson, *Replenish the Earth: Living Resource Conservation for Sustainable Development* (Albury: Catchment Education Trust, 1982), 2, 4, 6, 15; L. Robin, *Defending the Little Desert: The Rise of Ecological Consciousness in Australia* (Melbourne: Melbourne University Press, 1998), 134–5; 144–5; D. Hutton and L. Connors, *A History of the Australian Environmental Movement* (Cambridge: Cambridge University Press, 1999), 125.

84 Jones, 'Salinity spread'.

85 R. Brindal, 'Irrigation guru retires', *Salt Force News* 21 (May–June 1991): 13.

86 L. G. Heath, *Chairman's Report to 1979 Annual Meeting of Goulburn Irrigation Region Drainage Action Committee*, 13 October 1980. 6008, 74/20650, 1–2. Public Record Office Victoria.

87 State Rivers and Water Supply Commission, 'Notes for: The Honourable F. J. Granter, M.L.C., Minister of Water Supply', 25 June 1975. 6008, 74/20650, 1. Public Record Office Victoria; A. Brown-Graham to W. A. Borthwick, *Submission to W. A. Borthwick—Further Allocation of Funds*, 1 July 1975, 2; Anonymous, 'Community call'.

88 Anonymous, 'Be counted for the KIRSAC', *Northern Times*, 8 June 1976.

89 C. L. Spowart, *Minutes of Meeting held at the Shire Offices, Kerang, on 5th March, 1985*, George and Maureen Hardwick (Kerang), VIRPO Folder, 1; G. O. Jones, *Minutes of Meeting held at the State Public Offices, Kerang on 4th October 1988*, George and Maureen Hardwick (Kerang), VIRPO Folder, 1; N. J. Mitchelmore, *Salinity Committee Recommendations*, 18 May 1985. 11493, GIRDAC—General 83–93, 1. Public Record Office Victoria.

some basic understanding of ecological principles, like the operation of the water cycle, the GMID's headworks and catchment areas, it was difficult to get across the message of the interrelationships of irrigators with their neighbours, district and region.⁹⁰ Its chairperson Russell Smith told a Pyramid Hill meeting in 1986 that '[w]e must recognise to a large extent we are responsible. Get advice on what's best for your farm. Work together to make sure no water is allowed to sit. Plant trees on intake areas. Improve irrigation practices'.⁹¹ Salinity control required vigilance, not just technology.

Under control?

In 1988, European Australia's bicentennial and 135 years after the first recorded signs of anthropogenic salinisation, despite all efforts by communities and governments, salinisation continued to be an unresolved issue. However, a new attempt at resolution was underway. 'Salt Action—Joint Action', the Victorian Government's long-term strategy for salinity control, was launched after decades of degradation, political haggling and upheaval in the MDB's communities.⁹² Salinisation was now deemed a top priority environmental problem. Phillip Toyne, director of the Australian Conservation Foundation, called land degradation, including soil erosion and expanding salinisation, 'Australia's greatest environmental challenge'.⁹³ A timely warning, considering that, at this time, it was estimated that 960 km² of irrigated land in the Murray–Darling Basin was affected by salinisation and 560 km² had water tables within 2 metres of the surface, which were rising rapidly in many areas.⁹⁴ 'Salt Action' marked a turning point in the way salinisation was approached. In 1975, the SRWSC had favoured a one-off engineering intervention to retain or restore the environmental security of the users of its anthropogenic working landscape. Now, a long-term, incremental approach, based on a co-operation between governments, experts and the communities, in combination with technological and agricultural solutions, was chosen. This would have been impossible without the communities' persistent self-help and organisation. They had shown that they were capable of solving their own problems, provided they received assistance.⁹⁵ Upon visiting the Kerang Lakes area in April 1986, Joan Kirner, minister for conservation, forests and lands, had shown herself impressed 'with the community and the expertise of local conservationists and their willingness to tackle salinity and conservation

90 Parliamentary Public Works Committee at Kerang, *George Ernest Hardwick*, 27 July 1978. 11559, 24.07.27 PT4, 560–2. Public Record Office Victoria.

91 Anonymous, 'History has its salinity lessons', *Northern Times*, 8 April 1986.

92 Anonymous, 'Launch of salt action: Joint action', *Salt Force News* 9 (June–July 1988): 1.

93 P. Toyne, 'Putting our house in order', *The Age*, 9 December 1988.

94 Murray–Darling Basin Ministerial Council, *Murray–Darling Basin Environmental Resources Study* (Sydney: State Pollution Control Commission, 1987), 93.

95 Salinity Committee, *Salt of the Earth*, 157, 164, 174, 199.

problems'.⁹⁶ It was partly due to this impression gained by one of the key architects of the program that the Victorian Government decided to hand some of the responsibility for tackling salinisation to community groups. Effective salinity control, it was now recognised, required local knowledge and involvement. Put in a slightly Machiavellian way, the local activists were also in a good position to 'sell' the program to their fellow citizens, which would aid its acceptance in Victoria's rural communities and lend credibility to the governments' salinity policy. In any case, the government was not prepared to hand full control to the local experts and turn their existing organisations into autonomous authorities. Instead, it launched its own officially endorsed community groups and invited them to join.⁹⁷

And they did. The leadership fell to protagonists from the Salinity Action Groups: John Dainton, a dairy farmer from Mooroopna and chairperson of GIRDAC, took the chair of the 'Salinity Pilot Program Advisory Council' that was to spearhead salinity control in the Shepparton region.⁹⁸ Gyn Jones joined the corresponding 'Kerang Lakes Area Working Group'. These groups were tasked with developing salinity management plans for their respective regions while balancing the needs of agriculture, conservation, tourism, local communities and other users in the MDB.⁹⁹ It was a 'friendly takeover', which caused the established 'scene' of community activists to gradually wither away. However, with salinisation now being a top-priority environmental issue, and their key leaders becoming part of officially endorsed committees for salinity management and community education, they had achieved their core goals.¹⁰⁰

The government also started a variety of other initiatives. In 1986 the first issue of *Salt Force News*, a bimonthly magazine to keep people informed about 'what's happening on the salt front', was published.¹⁰¹ On World Environment Day, 5 June 1988, 'Greening Victoria' was launched. In Seymour, near Bendigo, 400 Girl Guides defied the pouring rain and freezing cold and planted more than 17,000 trees. These were supposed to be the first of more than a million to be planted across the state in known salinity recharge areas. The girls were accompanied by Lord

96 Anonymous, 'Lakes salinity talks pledged', *Northern Times*, 8 April 1986.

97 Russ, *Salt Traders*, 195–8.

98 Goulburn–Broken Region Salinity Pilot Program Advisory Council, *Plan*, iv, 3–4; Russ, *Salt Traders*, 226–8.

99 Kerang Lakes Area Working Group, *Plan*, iii, xxvi–xxvii.

100 C. L. Spowart, *Salinity Activities Round-Up*, 29/9/87, George and Maureen Hardwick (Kerang), VIRPO Folder; C. L. Spowart, *Letter to KIRSAC Members*, 21 February 1987, Agriculture Victoria, Kerang, KARE Folders, KIRSAC, 2; G. O. Jones, *Minutes of Meeting held at the Rural Water Corporation Offices at Kerang, on Tuesday, October 5th, 1993*, George and Maureen Hardwick (Kerang), VIRPO Folder, 1; C. Davies, *President's Report 1994*. ARC IRRIG. 1994 ANN REPORT S.H.I.R.F. Swan Hill Regional Library; C. Davies, *Annual Report—S.H.I.R.F. 1996*. ARC IRRIG. 1996 ANN REPORT S.H.I.R.F. Swan Hill Regional Library; Hardwick, 'A historical report', 40.

101 M. L. Considine, 'Editorial', *Salt Force News* 1 (December 1986): 2.

Mayor of Melbourne Alexis ('Lecki') Ord, Victorian Guides Commissioner Maren Chandler, Victorian Farmers Federation President Heather Mitchell and future premier of Victoria Joan Kirner.¹⁰²

The last two women were also responsible for what is likely the most prominent initiative that can be linked to salinisation—Landcare. Even though its roots can be traced back to farmer-led initiatives in Western Australia and Victoria, which were galvanised by dryland salinity, its breakthrough can be attributed to the alliance between Kirner and Mitchell. They collaborated in the formation of this community-based program to reverse land degradation, which would tackle a range of issues like salinisation, soil erosion, pest infestation, and loss of native plants and animals. It aimed to facilitate community participation, educate farmers about land management and instil an ethic of stewardship in their approach to land use. The program was officially launched on 25 November 1986 at Stricta Hill near St Arnaud alongside the first group at Winjallock, which focused on establishing deep-rooted pastures on the bare hills of the district. Funding for Landcare came from the Victorian Government. By 1990 there were 70 groups in the state. Subsequently, the Commonwealth Government declared the 1990s the 'Decade of Landcare'. In 1993, the National Landcare Program was launched. Landcare brought focus, funding, credibility and national attention to a wide range of conservation issues beyond salinisation.¹⁰³

Salinisation, the dialectic of 'too much water', had profoundly transformed the GMID's communities. Decades of degradation had disintegrated the fabric of smaller towns when farmers were forced to give up, and young people left the area. The associated stress and anxiety were unquantifiable. Their natural environment was marked by the impacts of high salinity. However, salinisation had not caused universal decline of the GMID's communities. One important reason for this was the collaboration of community initiatives with governments to mitigate the impacts of salinisation that had now been institutionalised and birthed a vibrant scene of conservation activities. Yet there was still no end in sight.

The new approach, however, gained some initial successes. By 1994, 59 per cent of farmers knew about their local salinity management plan and 53 per cent said that they had already begun to implement strategies to reduce salinity on their properties.¹⁰⁴ In 1992, irrigated pasture and cropping areas in the Kerang Lakes

102 Anonymous, 'Greening Victoria launched on World Environment Day', *Salt Force News* 9 (June–July 1988): 8; Salt Force, *Greening Victoria* (Seymour: [Salt Force], 1988).

103 Anonymous, 'Minister launches LandCare', *Salt Force News* 1 (December 1986): 3; M. Johnson et al., 'Landcare in Australia', in *Landcare. Local Action—Global Progress*, ed. D. Catacutan et al. (Nairobi: World Agroforestry Centre, 2009), 14–16; A. Campbell, *Landcare: Communities Shaping the Land and the Future. With Case Studies by Greg Siepen* (St Leonards: Allen & Unwin, 1994), 22–31; R. Broome et al., *Mallee Country: Land, People, History* (Melbourne: Monash University Press, 2020), 331–2.

104 Anonymous, 'Melbourne accepts salinity as a major environmental issue', *Salt Force News* 39 (October 1994): 15.

area had been expected to have their annual farm production reduced by 25 per cent in 30 years due to salinisation. This would have reduced the value of farm gate production by \$3 million per year. In 2002, the gross value of agricultural production was up by 100 per cent. Almost 90 km of farm drains and 24 reuse systems had been constructed. About 46,000 trees had been planted.¹⁰⁵

Still, at the end of the twentieth century, the Murray River and the Murray–Darling Basin were, in Don Garden’s words, ‘in a state of ecological disaster’. The Murray was suffering from declining water quality due to salt, silt, fertilisers and pesticides from agricultural and pastoral properties.¹⁰⁶ A basin-wide ‘Salinity and Drainage Strategy’, launched in 1988, had probably gained the basin a 20-year reprieve. Nonetheless, it was estimated that, without substantial intervention, 30 to 50,000 km² of land in the MDB would become salinised in the following hundred years.¹⁰⁷

Enter the ‘Millennium Drought’, the ‘longest and most serious drought in Australian history’, which began in late 1996 and lasted until mid-2010 in the southern part of the continent.¹⁰⁸ The ‘Big Dry’ severely affected the Murray–Darling Basin. Low rainfall and the lowest inflows into the Murray in recorded history caused flows into South Australia to virtually cease. In 2002, the Murray mouth almost closed, forcing round-the-clock dredging for the next eight years to keep the river flowing into the sea at Lake Alexandrina. Even though the drought prompted record levels of salinity in some areas, overall, it caused groundwater levels to fall to the extent that it reduced many salinity problems in the short term. It halted the spread of salinisation in most of the worst-affected regions, especially in south-west Western Australia and Victoria.¹⁰⁹ Furthermore, the mitigation schemes put into place, mostly since 1988, have contributed to the new situation.¹¹⁰

105 Kerang–Swan Hill Community Working Group, *Kerang–Swan Hill Salinity Management Plan 1993–2002*, ([Melbourne]: Agriculture Victoria, 2002), 2–8.

106 Garden, *Australia*, 113.

107 Murray–Darling Basin Ministerial Council, *Basin Salinity Management Strategy 2030* (Canberra: Murray–Darling Basin Ministerial Council, 2015), 2–3; Murray–Darling Basin Ministerial Council, *The Salinity Audit of the Murray–Darling Basin: A 100-Year Perspective, 1999* (Canberra: Murray–Darling Basin Commission, 1999), 37.

108 M. Heberger, ‘Australia’s millennium drought: Impacts and responses’, in *The World’s Water: The Biennial Report on Freshwater Resources*, ed. P. H. Gleick (Washington, DC: Pacific Institute for Studies in Development, Environment, and Security, 2011), 121, doi.org/10.5822/978-1-59726-228-6_5; ‘Recent rainfall, drought and southern Australia’s long-term rainfall decline’, Bureau of Meteorology, last modified April 2015, www.bom.gov.au/climate/updates/articles/a010-southern-rainfall-decline.shtml, accessed 1 September 2021.

109 Australian State of the Environment Committee, *State of the Environment 2016: Land* (Canberra: Australian State of the Environment Committee, 2016), 73; ‘Millennium drought’, Department for Environment and Water, South Australia, www.environment.sa.gov.au/topics/river-murray/about-the-river/millennium-drought, accessed 3 September 2021.

110 Murray–Darling Basin Ministerial Council, *Basin Salinity Management Strategy 2030*, 3–4; Murray–Darling Basin Ministerial Council, *Basin Salinity Management 2030: Summary Report 2015–16* (Canberra: Murray–Darling Basin Authority, 2017), 2.

In 2009–10, the Murray–Darling Basin’s salinity target was reached for the first time, and it has been met ever since then, at the time of writing.¹¹¹ ‘Salinity’, one farmer told me when I visited Kerang in 2017, ‘is a thing of the past’. While this is an exaggeration, given that with each onset of wetter conditions, salinisation is bound to increase, it has definitely lost its immediate urgency.¹¹² However, this new state of affairs is not a restoration of ‘environmental security’ for the many users of the MDB. Rather, the double-edged nature of the ‘Millennium Drought’, which brought so many hardships to the region while at the same time affording them a reprieve from salinisation, shows that, despite all human efforts, the limiting and enabling dynamics of the natural environment continue to shape our possibilities.

The state of environmental insecurity is bound to continue. In the horizon of climate change, other pressing issues, chiefly the future availability of water, have since assumed priority over salinisation.¹¹³ However, when travelling through the GMID today, with a bit of practice the legacy of salinisation can still be read in the landscape.

Figure 2: Dead trees from salinisation near Bears Lagoon, 21 July 2017.

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111 Murray–Darling Basin Ministerial Council, *Basin Salinity Management 2030: Status Report 2015–16* (Canberra: Murray–Darling Basin Authority, 2016), 3–4; Murray–Darling Basin Authority, *Basin Salinity Management 2030: 2018–19 Comprehensive Report. March 2020* (Canberra: Murray–Darling Basin Authority, 2020), 9–10.

112 K. Auty, *2013 Science, Policy, People: Victoria State of the Environment* (Melbourne: Commissioner for Environmental Sustainability, 2013), 117.

113 ‘Water availability in the Murray–Darling basin: A report from CSIRO to the Australian Government’ (2008–9), CSIRO, 5, 8, 10, 26, 28, 34, 43, 45, hdl.handle.net/102.100.100/116603, accessed 31 August 2021.

Figure 3: Plaque for Gyn Jones at Agriculture Victoria, Kerang, 8 August 2017.

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