

RFM DISCUSSION PAPER #6:

An analysis of water resources sharing within the Murray-Darling basin.

Paddle steamer 'Nile' on the dry riverbed of the Darling River, Bourke NSW, circa 1908

A TRAGEDY IN OUR COMMON

David Bryant, RFM Managing Director

“On May 29 1435, ... 84 irrigators served by the Benacher and Faitanar canals in Valencia gathered at the Monastery of St. Francis to draw up and approve formal regulations. Those regulations specified who had rights to water from these canals, how the water would be shared in good years as well as bad, how responsibilities for maintenance would be shared, what officials they would elect and how, and what fines would be levied against anyone who broke their rules”.¹

Elinor Ostrom

Winner of the Nobel Prize in Economic Sciences, 2009

The Murray-Darling Basin is Australia's largest and most important catchment, occupying 1.06 million km², with 77,000 km of rivers, over 30,000 wetlands, and a multitude of plants and animals.² It provides a reliable water supply to four states and a territory, is home to over two million people, provides drinking water for an additional two million, produces much of Australia's food, approximately 40% of the nation's agricultural revenue,³ plus renewable energy from the Snowy Mountains Scheme. It is a vast natural resource that, like much of the planet, has been transformed from an ecological masterpiece into a blend of national parks, remnant vegetation, ephemeral wetlands, and a set of controlled landforms and waterways as a consequence of humanity's need for economic activity, food and, particularly, water.

This article is about the Murray-Darling Basin (the Basin) and how to share it.

Beginning with a weir on the Goulburn River in Victoria in 1887, the Basin's waterways have been controlled through the construction of nearly 240 dams, and over 200 weirs, locks and barrages.⁴ When full, the major dams store 22,214 gigalitres, or 22.2 billion litres, of water, enabling a reliable water supply for irrigation and

human consumption. The weirs and locks were largely constructed in the 1920s to raise river water levels, so water could be diverted to towns and irrigation areas, or to provide greater river depth for boats. The barrages were constructed in the 1930s to stop sea water from the Southern Ocean entering the two lakes located at the end of the Murray River system.

On 24 July 2017 the ABC's Four Corners broadcast a program alleging water theft from northern rivers in the Basin by certain irrigators, plus misconduct and maladministration within the NSW Government. This triggered seven investigations federally and within NSW and Queensland, including a review by the Murray-Darling Basin Authority (MDBA) and an investigation by the NSW Independent Commission Against Corruption. On 26 November 2017, the Premier of South Australia announced a state Royal Commission into the allegations.

This recent drama is an example of a Tragedy of the Commons, an economic theory first postulated in 1833 by William Forster Lloyd,⁵ and subsequently named and made famous in a speech and academic paper published in 1968 by ecologist Garrett Hardin.⁶ In his published lectures, Lloyd observed that commons pastures, accessible to all, were being overgrazed,

1 Ostrom, E., 1990, *Governing the Commons: The evolution of institutions for collective action*, Cambridge University Press, United Kingdom p.69. Murray

2 Darling Basin Authority, 2017, *Basin facts*, accessed online at <https://www.mdba.gov.au/>.

3 Murray-Darling Basin Authority, 2017, *The Murray-Darling basin at a glance*, accessed online at <https://www.mdba.gov.au/sites/default/files/pubs/MDBA-at-a-glance.pdf>.

4 Murray-Darling Basin Authority, 2017, *private correspondence*.

5 Lloyd, W.F., 1833, *Two lectures on the checks to population: delivered before the University of Oxford, in Michaelmas term 1832*, Oxford, United Kingdom.

6 Hardin, G., 1968, 'The Tragedy of the Commons', *Science*, American Association for the Advancement of Science, Washington D.D, USA.

rendering them “bare-worn, and cropped so differently from the adjoining inclosures”.⁷ On the unregulated common he concluded that farmers could choose to place one additional animal on the common, since the benefit would belong to him while the cost would be borne by all. Consequently the placement of additional animals would accelerate until the pasture was bare-worn.

Since Hardin published his observations, the theory has been the subject of numerous studies and has become fundamental to the governance of shared natural resources such as the ocean’s fisheries, forests and river systems. Subsequent studies have found that where ‘appropriators’ have an advantage, such as being first movers or lower cost extractors, they are likely to take advantage of this and extract more from the resource than those without such an advantage, thereby accelerating the demise of the resource.

Prior to the introduction of water extraction regulations in the Basin, such advantages existed for upriver water users in NSW, Queensland and Victoria. Irrigators in these states were able to extract water from the common, obtain a private benefit and leave the cost to be borne by those downriver, particularly water users and the environment in South Australia. This historical fact and the theory of the Tragedy of the Commons explain why even today, water use by eastern states is such an important political issue for South Australians and environmentalists.

Hardin, in his 1978 paper, recommended centralised control as the means for preserving a common: “if ruin is to be avoided in a crowded world, people must be responsive to a coercive force outside their individual psyches, a Leviathan, to use Hobbes’s term”.⁸ The term ‘Leviathan’, refers to the book of that commonly referred to title by Thomas Hobbes, which proposed a structure of governance where individuals cede their rights to an absolute monarch so that the monarch can enforce peace on all. Hardin here is arguing that commons, or shared natural resources, should be governed by a single absolute authority.

The creation of a Leviathan, or coercive force, for management of water extractions first begun in 1914 with the creation of the Murray Waters Agreement between the states. Reforms continued over the following century, culminating with the most significant and recent steps taken to regulate the Basin occurring at the height of the millennium drought. In January 2007 the Howard Government committed \$10 billion towards the improvement of water use and reduction of water extractions. The Federal Parliament then enacted the Water Act 2007, which created the MDBA to develop a plan for the Basin, and ultimately a total of \$13 billion was made available for reform. In July 2008, the Federal Government and the four states and territory within the Basin signed an Intergovernmental Agreement on a Murray-Darling Basin Plan. This document committed the signatories to a Basin Plan, with the primary objective of determining and achieving a sustainable limit of water extraction in the Basin. The Plan was finalised, and

7 Lloyd, W.F., 1833, *ibid*.

8 Hardin, G., 1978, as quoted from Ostrom, E., *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press, United Kingdom.

9. Myerson, R.B., 1991, *Game Theory: Analysis of Conflict*, Harvard University Press, USA, p.1.



commenced on 29 November 2012.

Others have stated that the only way to regulate a common resource is to divide it, so that it is no longer a common, and issue private property rights. To some extent, this is what has occurred in the Basin, with the issue of privately owned water entitlements, during the second half of the 20th Century.

Today the Basin is managed by a combination of the two approaches: a central government authority, assisted by state government agencies, which police the utilisation of private property rights issued to water users. This arrangement is often recognised in other countries as the model for world’s best practice. Despite these expensive, but tremendous advances, the Basin is still subject to bitter dispute and contest between irrigators, environmentalists, the concerned citizens of South Australia and all Australians with an interest in the health of our economy and the Basin’s river and wetland systems.

Is there a third way, or at least further improvements, that can be made in the interests of all?

The quote which began this article is from *Governing the Commons: The Evolution of Institutions for Collective Action*, written by Elinor Ostrom (1933 – 2012). In 2009, she was a joint recipient of the Nobel Prize in Economic Sciences, for her work on the economic governance of commons.

Ostrom studied the rules and systems of self-governance for ancient commons, including the irrigation systems in Valencia governed from 1445, common Alpine pastures at Törbel, Switzerland (1483), and millions of hectares of forest in Japan governed from around 1600 to the present, without signs of environmental degradation. These and many other commons that have self-governed over centuries were studied by Ostrom using her knowledge of political economics and game theory (the study of mathematical models of conflict and cooperation between intelligent rational decision-makers).⁹ Her observations of how these systems work are rich insights into human nature, explaining not just our acts of self-interest, but how we can organise to act co-operatively, because in a common this may be in our best interest.

Ostrom set out eight design principles she observed from the long enduring commons institutions she studied.¹⁰ Many of these design principles are present in the current

Basin Plan, such as: “clearly defined boundaries”, created by the issuance of volumetric water entitlements; “well-tailored appropriation rules” that vary extraction limits according to the seasonal water availability between valleys and the connected river systems. These design principles should be celebrated and appreciated as world class innovations.

Interestingly, Ostrom observed that in these self-governed commons: “the presence of good rules does not ensure that appropriators (such as water users), will follow them, [nor is it] an adequate explanation of the centuries of compliance by individuals who were not involved in the initial agreement”.¹¹ Another significant and simple observation was that external enforcement could not be used to explain the high levels of compliance, because there was no external enforcement – the commons were self-governed with compliance a function undertaken by the appropriators or individuals accountable to them.

While the Basin has thousands of appropriators for a myriad of purposes, the two largest categories of appropriation are for irrigation and the environment. While the environment would not normally be considered an appropriator, the politics and function of the Basin have evolved to make this conceivable. The largest single water entitlement owner is the Office of the Environmental Water Holder; a Commonwealth statutory office, which manages approximately 2,600 gigalitres of water entitlements, or about one quarter of all issued water entitlements.

Recent allegations regarding non-compliance by irrigators is symptomatic of a common with problematic compliance systems and provisions.

Following the Four Corners program, the author had numerous conversations with irrigators and officials regarding the possibility of non-compliance. Invariably irrigators stated it was inconceivable, or it was a case of a tiny minority bringing the majority into disrepute.

Conversations with personnel with experience in irrigation compliance revealed that tampering with water meters was not uncommon. While the practice was limited to perhaps 5% of irrigators, this group controlled a very significant amount of pumping capacity. Surveillance of tampering had diminished with departmental budget cuts, while a move to more predictable inspection visits had enabled reinstatement of meters prior to inspections. Legislative reforms have also diminished the power of government officers to impose timely sanctions on offenders, further eroding incentives for compliance. Finally, the recent MDBA report on compliance noted that most meters are insufficiently accurate to comply with Australian standards, and this standard is not mandated.¹² Given the measurement bias of those using meters, it is improbable that meters are over estimating water use.

It is little wonder that environmentalists, downstream water users and the people of South Australia remain concerned about the probability of obtaining a fair share of the common.

Compliance can be improved using two measures. Firstly, compliance systems can be improved by using modern telemetry and water metering systems – something

unavailable to the irrigators of Valencia in 1445. But high-tech systems are not enough. Compliance provisions must be improved if the Basin is to become a sustainably managed common.

The present provisions for assuring compliance within the Basin depend on state governments and the MDBA. The recent MDBA review makes recommendations for improvements that are commendable but ignore the lessons of centuries of experience documented by Ostrom, and her powerful observations of human nature educated through the sound mathematical understanding of the conflict and cooperation that is possible between intelligent rational decision makers.

Ostrom found that appropriators (such as water users), once in agreement, could work together and become the most effective means of monitoring and ensuring compliance with rules for governing their common. Were this to occur in the Basin, appropriators interested in end of stream flows could gain insights into the behaviour of those upstream. Simultaneously irrigators who, after all live in the landscapes we wish to sustain, could gain insights into the timing and efficacy of environmental flows. This process of building insight, whilst monitoring compliance, was observed to reinforce the management of numerous commons over many centuries.

This is not a recommendation to put irrigators alone in a position where they have a right to self-regulate their behaviour, since they must act alongside environmental and urban water holders. Nor is it a recommendation for another consultative committee without authority or autonomy to act. Instead, it is a recommendation for a body of water users that has the funds to maintain intelligence and surveillance activities, and the authority to impose the necessary strong penalties on those that break the rules. The body would then publicise both the information gathered from surveillance and the penalties it has imposed, so that water users can understand the strategies and scale of offences and the reassurance that offenders are appropriately penalised.

The notion that water users representing industry and the environment could act co-operatively in the same manner as those commons analysed by Ostrom still faces a major obstacle. Despite decades of incremental legislative reform and billions spent on managing a transition to a more environmentally sustainable regime, there is still great distrust between the two major appropriators of the Basin common. Those at the end of the Basin system continue to demand more water for the environment and end of stream flows, for the specific emblematic purpose of maintaining an open Murray Mouth. Meanwhile, irrigators further up the Basin system, working under the apprehension that these demands will never cease, assume an adversarial posture as the most effective means of defending their property and businesses.

Overcoming this obstacle requires the finalisation of what is called Sustainable Diversion Limits, which are the limits to the amount of water that can be extracted from each river system, and therefore the determinant of how much will be left for the environment and end of stream flows. Champions of the environment and industry should recognise the lessons of history and Ostrom’s acute observations on human behaviour, and understand that their causes will be realised more quickly and with greater certainty, if they learnt how to share.

10. Ostrom, E., 1990, *ibid*.

11. Ostrom, E., 1990, *ibid*, p.93.

12. Murray-Darling Basin Authority, 2017, *The Murray-Darling Basin Water Compliance Review*, Canberra, Australia, p.17.