

Basin Profile: Murray Darling Basin

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Water Scarcity Status

- Formed by the Murray, Darling, and Murrumbidgee rivers, the Murray-Darling Basin is home to 10% of the country's population and spans 14% of the country's landmass, encompassing the national capital, Canberra.
- Virtually all of the basin's water consumption from rivers, reservoirs, and lakes in the basin, is used for irrigation (largely fodder crops, cotton, and rice).
- The basin is afflicted with severe water scarcity, particularly during summer months when farms are being irrigated.
- Runoff reaching the sea is less than half of what it would be in an unaltered condition

Basin Overview

Southeast Australia

Area: 1,059,000 square kilometers

Climate: Arid to Semi Arid

Basin population: 2,000,000



Figure 1. Map of Australia with Murray-Darling basin highlighted (<http://www.mda.asn.au/>)

Located in the southeast corner of Australia, the Murray-Darling river basin is a 'liquid diamond' for the entire continent. The basin is formed largely by the Murray, Darling, and Murrumbidgee rivers. The Darling flows from the northeast portion of the basin and the Murray flows from the southeastern part of the basin, before meeting in the southwest portion of New South Wales. From there the rivers run together before flowing into Lake Alexandrina and The Coorong.

The basin is in an area subject to large seasonal temperature variation. The temperature can reach near 40 degrees Celsius during the peak of the summer and is capable of bordering on freezing during the dead of winter. This massive flux in temperature brings with it patterns of water scarcity. Evaporation is a major problem in the basin due to the fact that, "The MDB receives an average annual rainfall of 530,618 GL. Of this, 94% evaporates or transpires, 2% drains into the ground, and the other 4% becomes run-off" (ABS 2009).

The basin is home to 2.3 million people, 10% of Australia's population, and spans 14% of the continent's landmass, 1,059,000 km², just smaller than the combined areas of Texas and California. In total, approximately 3.6 million people rely on the basin for water. Infrastructure was built to provide water security during the months of severe water scarcity, resulting in many dams and weirs through the basin, with two large dams each capable of holding over 3,000,000 ML, the Hume Dam and the Dartmouth Dam residing on the main stem of the Murray. However, by

storing much of what little natural flow exists, little flow is being left for the rivers to sustain their ecological functions, and it shows in both water quality decline as well as declines in species richness and abundance.

A large water management body in Australia is the Murray-Darling Basin Authority, created by the Water Act of 2007, with a purpose of creating a sustainable plan of use for the basin's water resources, known as the Basin Plan. This recently created Authority replaces the Murray-Darling Basin Commission. Also created by the Water Act of 2007 was Commonwealth Environmental Water Holder, which is making strides to provide necessary environmental flows. The main goal of CEWH is to acquire water entitlements from willing landowners, currently delivering over 2000 Gigalitres back to the rivers and floodplains of the Murray-Darling basin. In addition, the Australian Competition & Consumer Commission was given the rights to enforce water market rules.

Agriculture in the basin provides a great economic benefit to Australia, accounting for 39% of Australia's Gross Value of Agricultural Production, equating to 15 billion dollars AUS. In an area dubbed the 'food basket' of Australia, providing one-third of the nation's food supply, water scarcity is not a welcome situation. A driving economic producer in the basin is the growing of cereals (wheat, barley, oats, triticale), producing a revenue in 2001 of 3.3 billion dollars (24% of the Murray-Darling's agricultural production), according to the Murray-Darling Basin Commission. Agriculture is not the top employer in the basin, but it does employ a significant portion of the basin's residents. The agriculture industry and the government each are responsible for 10% of the jobs in the Murray-Darling. Retail is the top employer, at 14% of the jobs in the basin, followed by health and community services (11%), and manufacturing (9%). However, from 1995-2006, the number of basin residents who listed agriculture as their form of employment dropped by 10%.

Water Scarcity Impacts

Environmental Impacts

As the use of water for irrigation and the alteration of flow from dams have increased, the effects have been felt by the basin's ecology. The River Red Gum is an abundant tree species in Australia, but numbers have decreased over time due to human influence. During the recent drought, with river flows heavily depleted for irrigation in South Australia, up to 80% of the River Red Gum trees died or became severely stressed. The trees rely on flood waters to provide water to the soils that their roots reside in, but with the construction of dams, the natural peak floods have been dampened, restricting the water supply to the tree's soils. Salinization of the soil has also proven detrimental to the species. The loss of this habitat is expected to harm the Azure Kingfisher as well.

One of the most famed and storied endemic species in the country is the Murray Cod. Already tied to the Aboriginal peoples through their river creation stories, the Murray Cod is likewise important to the non-Aboriginal peoples of Australia. It is the highest priced commercial fish, selling for about \$20/kg or more. Estimates say that in the last 50 years the Murray Cod population has conservatively decreased 30% (some estimates are much higher), with fewer large fish than historically noted. Of the habitats studied, 74% of the located Murray Cod habitats contain more than 50% woody debris cover. The problem is that woody debris is not beneficial for river transport and recreation, and over the years 'de-snagging' has occurred to clear the waterways, which has destroyed many habitat areas. Another source of population declines has been a physical blocking of stretches of the river, as well as the effects of structures such as dams.

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