



LEFT HIGH AND DRY? THREATENED SPECIES IN THE MURRAY-DARLING BASIN

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KEY MESSAGES

The object of the Murray-Darling Basin Plan is to return irrigation water to the environment to maintain wetlands and their biodiversity. However, nine years into implementation, benefits for threatened species are poorly-known. We examined whether the Plan is meeting its objectives for eight threatened flow-dependent species. We found:

- 1.Environmental water for threatened species is poorly coordinated and targeted, and reporting of outcomes is patchy and not fully publicly-available;
- 2.Monitoring and reporting was done in only 25% of all situations where a species was known to be present in a particular catchment and 50% of cases where a species was targeted for environmental watering;
- 3.Environmental watering does not adequately account for needs of species regarding frequency, duration and seasonality of watering. Lesser-known species, such as Sloane's froglet, have been ignored;
- 4.Indicators of abundance and occurrence (2012–2019) increased only for southern bell frog and trout cod and declines for Australian painted snipe. The remaining five species showed no changes, suggesting no benefits from environmental watering.

Our findings highlight the need for major improvements in monitoring and reporting of the effects of environmental watering on threatened species. Targeting and coordination to meet water requirements of particular species needs a major overhaul. Environmental watering needs to be integrated with other management actions if extinctions are to be avoided

CONTEXT

The Murray–Darling Basin has undergone major reductions in river inflows and its wetlands and rivers are in poor condition. Outflow to the sea is 40% of the volume before irrigation diversions commenced and the Basin has been in drought for 17 of the past 23 years. International environmental treaties, such as the Convention on Biological Diversity and Ramsar Convention on Wetlands, oblige the Australian government to ensure wetlands and their biodiversity are maintained, including threatened species. The Water Act (2007) and the Basin Plan (2012) were established to ensure these objectives are met by restoring water diversions to sustainable levels.

There has been no Basin-wide assessment of the effects of environmental water, released under the Basin Plan, on flow-dependent threatened species. Accordingly, we examined changes in the distribution, relative abundance and occurrence of eight species (two frogs, two waterbirds and four fishes; Table 1) between 2012–2019, using records from the Atlas of Living Australia and the Victorian and NSW biodiversity databases. We assessed if species were included as targets for environmental watering in each of the catchments in which they occurred and if the results were monitored and reported.

WHY THIS IS IMPORTANT

The Basin Plan is a AUD\$13b public policy initiative, central to long-term national water reform. Its legislated objectives are to maintain wetlands, rivers and their biodiversity. It is essential that these objectives are monitored and reported on publicly and transparently.

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KEY FINDINGS

We found two contrasting accounts of the conservation of threatened species under the Basin Plan. The official version, from monitoring funded by the Commonwealth Environmental Water Office, is that environmental watering has been a success, based on the assessment of some species in only some catchments.

KEY FINDINGS (CONT'D)

The other version is of sporadic and fragmented targeting of environmental watering for threatened species compared with their range extents, with half of the targeted events not monitored or reported on for the species we examined (Table 1).

"Without targeting species-specific water requirements and monitoring, the 'just add water' approach is likely to be insufficient to achieve conservation outcomes."

Environmental watering targeted only six of the species, with the lesser-known and smaller species of Sloane's froglet and flathead galaxias missing out.

In contrast, the widely-distributed, large-bodied silver perch was included in all but three catchment watering plans. Only a quarter of the possible species-catchment combinations were subject to monitoring and reporting. Of those species for which benefits from environmental watering were claimed, the evidence was often qualitative, anecdotal or not publicly available.

We found statistically significant increases in indicators of abundance and occurrence only for southern bell frog and trout cod (Figure 1). Australian painted snipe showed statistically significant declines and the other five species showed no changes, indicating no benefits from environmental watering. Of the two species that increased in relative abundance and occurrence, both were subject to National Recovery Plans and diverse conservation management.

The approach to conservation of threatened species has been to 'just add water' and assume this will be adequate. However, without targeting species-specific water requirements and monitoring to improve understanding of how to best conserve these species, this approach is likely to be insufficient to achieve conservation outcomes.

Catchment (river valley)	Sloane's froglet	Southern bell frog	Australasia n bittern	Australian painted snipe	Trout cod	Murray hardyhead	Silver perch	Flathead galaxias
Warrego			Orange	Orange			Blue	
Condamine-Balonne	Orange		Blue	Blue			Blue	
Moonie			Orange	Orange				
Border Rivers	Orange		Blue	Blue			Yellow	
Gwydir			Yellow	Yellow			Orange	
Namoi	Orange		Orange	Orange			Blue	
Macquarie-Castlereagh		Orange	Yellow	Yellow	Blue		Blue	
Barwon-Darling			Yellow	Orange			Orange	
Lower Darling			Orange	Orange			Yellow	
Lachlan	Orange	Yellow	Orange	Green			Blue	
Murrumbidgee	Orange	Yellow	Yellow	Blue	Yellow		Yellow	Orange
Central Murray	Green	Green	Yellow	Yellow	Yellow	Blue	Yellow	Blue
Edward-Wakool		Orange	Green	Orange	Yellow		Yellow	
Ovens	Green	Blue	Blue	Green	Blue		Orange	Orange
Goulburn		Orange	Yellow	Orange	Yellow		Yellow	Orange
Broken		Orange	Blue	Orange	Orange		Blue	Orange
Campaspe		Orange	Orange	Orange	Orange		Blue	
Loddon		Green	Green	Orange	Orange		Blue	
Wimmera-Avoca		Orange	Orange	Orange			Green	
Lower Murray		Yellow	Yellow	Yellow		Yellow	Yellow	

Table 1. Threatened species ('spp.') in relation to their targeting for environmental water. Yellow: spp. targeted and reported on. Blue: spp. targeted but not reported on. Green: spp. present but not targeted or reported on. Orange: likelihood of presence based on occurrence records post-1990 in the Atlas of Living Australia. There are 97 species-catchment combinations.

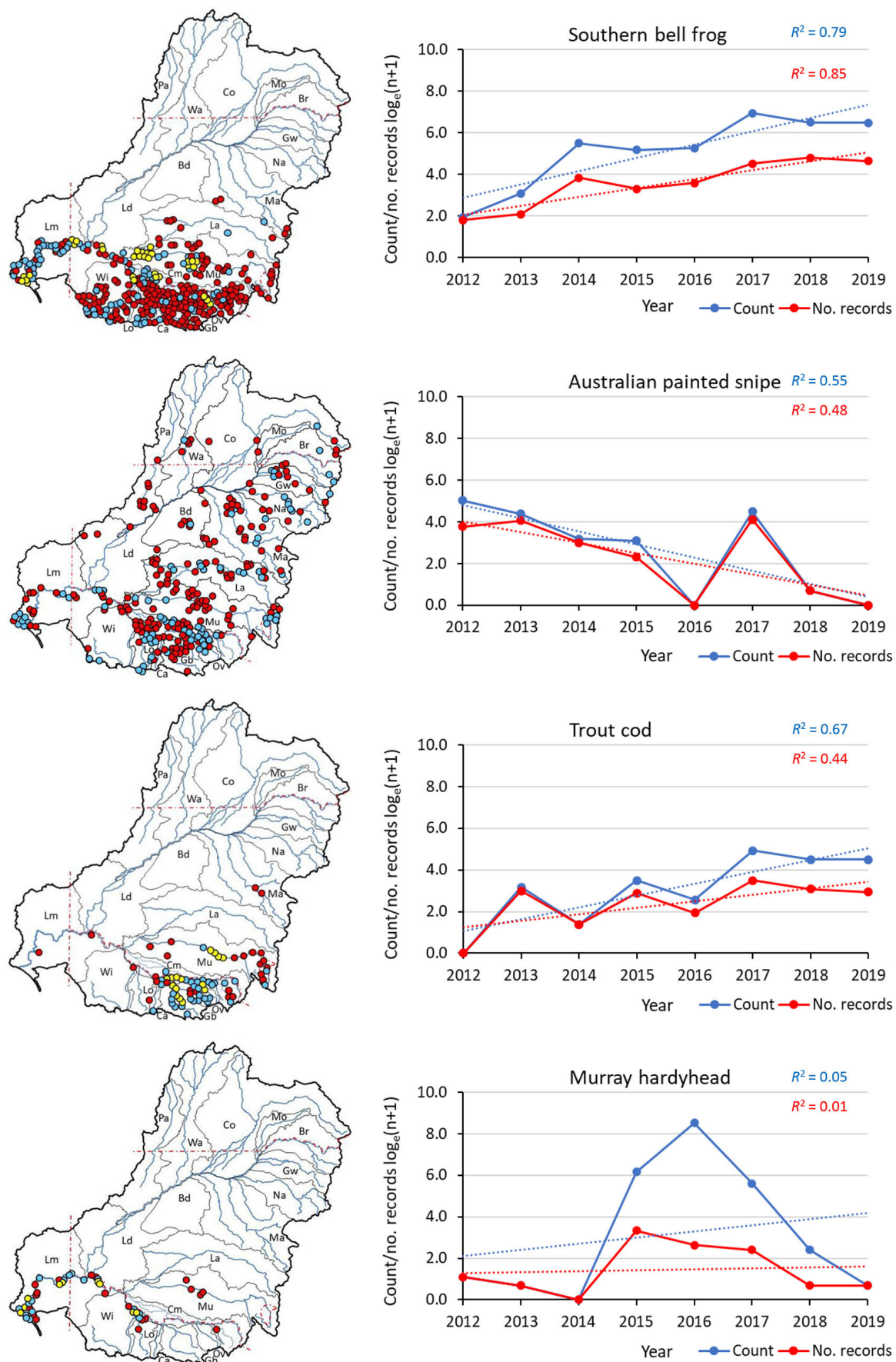


Figure 1. Distribution, relative abundance ('count') and occurrence ('no. records') of four of the eight threatened species, showing increases for southern bell frog and trout cod, declines for Australian painted snipe and major fluctuations for Murray hardyhead. Red dots on distribution maps = pre-1990 records; blue = post-1990 records; yellow = known breeding sites

KEY LESSONS

Environmental watering is important for the conservation flow-dependent threatened species. However, the current approach to conservation is selective, partial and ineffective. Based on our findings:

- The Basin Plan has not yet delivered on its key goal of conserving biodiversity. A more holistic and comprehensive approach to conservation management is required if conservation outcomes are to be successful.
- A requirement from a conservation governance perspective is to shift from a top-down planning and implementation approach to bottom-up adaptive management strategies that engage landholders, Indigenous groups, local communities and NGOs.
- Water management plans should be planned and coordinated with all stakeholders through processes of public engagement and citizen science.
- Intensive, local-scale monitoring and reporting of species, especially those that are particularly rare, cryptic or hard to monitor, has the potential to greatly improve knowledge of the distribution and population status of these species.

If government agencies do not shift away from the ‘just add water’ approach, it is likely that populations of threatened flow-dependent species will continue to decline.

The Institute for Water Futures works collaboratively with stakeholders in government, community and business to understand change and enable action in long term water research, policy and management.

MORE INFORMATION

Ryan, A., Colloff, M.J. and Pittock, J. (2021) Flow to nowhere: the disconnect between environmental watering and the conservation of threatened species in the Murray–Darling Basin, Australia. *Marine and Freshwater Research*. DOI: [10.1071/MF21057](https://doi.org/10.1071/MF21057)

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Sunset on the Murray River. Photograph courtesy of Susan Ward, 2019.

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