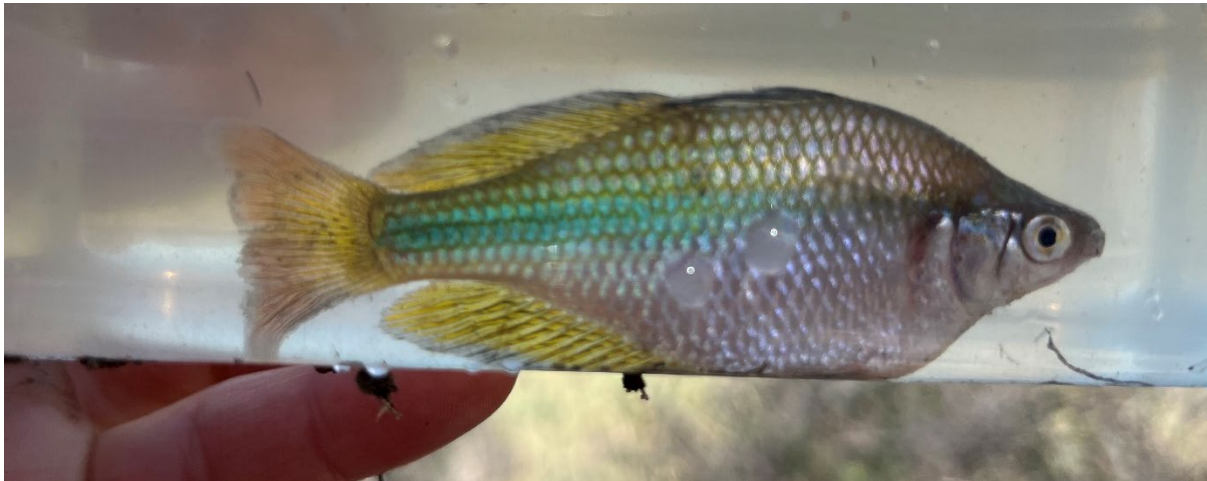


Murrumbidgee Monitoring, Evaluation and Research Program, ecological responses to Commonwealth environmental water, Field Report. December 2021



Murray-Darling rainbow fish were detected at sites throughout the Yanco Creek system, mid and Lowbidgee wetlands, December 2021. Photo credit: Anna Turner.

Turner, A.E., Moore, E., Talbot, S., Michael, D.R. and Wassens, S. (2021). Murrumbidgee Monitoring, Evaluation and Research Program, ecological responses to Commonwealth environmental water, Field report. Number 10, December 2021. Charles Sturt University, Institute for Land, Water and Society. Prepared for the Commonwealth Environmental Water Office.

Further information:

Associate Professor Skye Wassens
School of Agricultural, Environmental and Veterinary Sciences, and Institute for Land, Water and Society
Charles Sturt University, PO Box 789, Albury NSW 2640
Ph: +61 2 6051 9513 Email: swassens@csu.edu.au

Copyright

© Copyright Commonwealth of Australia, 2021



Murrumbidgee Monitoring Evaluation and Research Program, ecological responses to Commonwealth environmental water Field report. Number 10, December 2021 is licensed by the Commonwealth of Australia for use under a Creative Commons By Attribution 3.0 Australia licence with the exception of the Coat of Arms of the Commonwealth of Australia, the logo of the agency responsible for publishing the report, content supplied by third parties, and any images depicting people. For licence conditions see:
<http://creativecommons.org/licenses/by/3.0/au/>

Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment. While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

Ecological responses to Commonwealth environmental water in the Murrumbidgee system as of 31 December 2021

This quarterly report describes preliminary outcomes of Commonwealth environmental watering actions at selected wetlands in the mid and lower Murrumbidgee. These surveys are conducted four times a year as part of the Murrumbidgee Monitoring, Evaluation and Research Program (MER) and include assessment of ecological outcomes in the Murrumbidgee River and connected wetlands through the mid-Murrumbidgee and lowbidgee floodplain wetlands as outlined in the Murrumbidgee Monitoring and Evaluation Plan. Additionally, preliminary findings from monitoring surveys in the Yanco Creek system (YCS) are reported here. Surveys were conducted in the YCS in October and December 2021 and are being conducted during the 2021/22 water year in conjunction with Murrumbidgee MER surveys.

Due to high water levels, Covid19 restrictions and inclement weather, routine monitoring for the 2021/22 field-season was delayed until October/November. As a result, the second round of surveys for the season were conducted in December. In December, routine monitoring of birds, fish, frogs, tadpoles, water quality and vegetation diversity was undertaken across the four core sites in the mid Murrumbidgee (Yarradda, Sunshower, Gooragool and McKenna's Lagoons) and five sites in the lower Murrumbidgee (Waugorah, Banim (Avalon) Swamp, Bala (Eulimbah) Swamp, Bayil (Telephone) Creek and Nap Nap). Access to Piggery Lake, Two Bridges and Mercedes swamps was not possible during this survey occasion due to high water levels preventing access via road. As a substitute, monitoring was conducted at Yanga Lake inflow, Uara creek and Shaws wetland during December.



Andrea Mitchell (YACTAC) and Emmalie Sanders (PhD candidate) taking the chance to learn waterbird species during monitoring at Rhyola wetland in December 2021. Photo credit: Anna Turner

Wetland survey sites and paired river sites in the YCS (Rhyola, Wanganella, Bundure and Broome) were monitored for the second time this season. Data from bat recorders deployed at an additional ten sites in the YCS will be collected in January 2022 and set to record for another month. Camera traps targeting rakali have had successful results leading to targeted trapping by PhD researcher, Emmalie Sanders. Platypus surveys will be conducted in early 2022 by UNSW.

This report summarises the activities and outcomes of monitoring in the mid and lower Murrumbidgee as well as the Yanco Creek system conducted in December 2021. Vegetation surveys and water bird surveys were completed at all wetlands in conjunction with netting and other monitoring activities.

Watering update

The Murrumbidgee catchment received above average rainfall in the lead up to the 2021-22 monitoring season. Above average rainfalls have continued to the end of 2021. This has resulted in very high water levels in all the mid and lower Murrumbidgee monitoring sites, in some cases preventing access via road. Access was still not possible to Piggery Lake, Two Bridges and Mercedes swamps during the December 2021 surveys, therefore Yanga Lake inflow, Uara creek and Shaws wetland were monitored in Redbank as a substitute.

- Mid-Murrumbidgee: The four core monitoring sites were wet. McKenna's Lagoon was surveyed for the second time this season, prior to which it hadn't been monitored since 2016. Large and small fyke nets were set at all sites. At Gooragool Lagoon, monitoring was conducted closer to the connecting channel consistent with the 2020/21 field season.

- Gayini Nimmie-Caira: Large and small fyke nets were set at all sites. At Banim Swamp the dam was full and overflowing into the surrounding wetland. Bala Swamp was full with water flowing fast out into Fairfax Swamp (Suicide Bank) and into floodplains to the south. Bayil Creek was full and overflowing into surrounding lignum/blackbox woodland. Lignum swamp surrounding the main Nap Nap wetland were full but the wetland itself retained residual water at 70 cm deep and as a result nets were set on the eastern side near the regulator. Water quality was low at Bayil Creek and Nap Nap Swamp with an average dissolved oxygen reading of 2.0 mg/L and 1.65 mg/L respectively.

- Redbank (Yanga NP): Water levels at Waugorah Lagoon were very high, overbanking into the adjacent Black Box vegetation community; large and small fyke nets were set. Two Bridges Swamp, Piggery Lake and Mercedes Swamp were inaccessible via road due to high water levels. Yanga Lake inflow, Uara creek and Shaws wetland were monitored in Redbank as a substitute, these three sites also had high water levels.

-Yanco Creek System (YCS): Wetlands were paired with near-by creek sites in the YCS. Rhyola wetland was full, however, D- fykes and small nets were still set in relation to the water depth. Access was not possible to the adjacent Billabong Creek for paired river site monitoring due to recent rainfalls. At Wanganella, nets were set in the southern part of the wetland east of the Cobb Highway and in the adjacent Forest Creek. Riverbanks were too steep and channels too deep to set nets in the Billabong Creek at Wanganella. At Broom and Bundure, large and small fyke nets were set in the wetland and nearby in Yanco Creek. Water levels were higher than October surveys with a peak in water levels making its way through the system during the December survey period.



Counting and measuring fish caught at Bala swamp on the last day of monitoring for 2021. From left to right: Sarah Talbot, Eva Moore and Lachlan Spalding. Photo credit: Anna Turner.

Table 1- Site summary of findings

	Status	Notes
Mid Murrumbidgee		
McKennis	Full	Small catch, mostly carp gudgeon, smelt and small carp (n = 100 at < 90 mm). Golden perch (475 mm). No turtles.
Gooragool	Full	One bony bream (293 mm), carp gudgeon, yabbies and shrimp. Large catch of exotic species with >40 carp and oriental weather loach. One Macquarie River turtle and three broad-shelled turtle.
Sunshower	Full	Moderate catch of carp gudgeon, shrimp gambusia, < 100 carp (50 mm), goldfish and oriental weather loach. One broad-shelled turtle. Over 40 <i>Limnodynastes</i> sp. tadpoles.
Yarradda	Full	Carp gudgeon, yabbies and shrimp, >20 carp, gambusia and oriental weather loach. Three eastern long-necked turtles.

Lower Murrumbidgee			
Nap Nap	Full		Small number of carp gudgeon, carp, oriental weather loach and gambusia. Small catch of yabbies. One southern bell frog tadpole and small numbers of <i>Limnodynastes</i> sp. tadpoles in nets. Small numbers of southern bell frog calling and a small number of adult southern bell frogs observed. Spotted marsh frog, eastern sign-bearing froglet, Peron's tree frog and barking marsh frog recorded. High numbers of southern bell frogs were calling to the north of the main wetland, closer to main river channel.
Banim (Avalon) Swamp	Dam full and overflowing into wetland which is ½ full		Carp gudgeon, flat-headed gudgeon, smelt and two Murray-Darling rainbow fish. One southern bell frog tadpole. Southern bell frogs, Peron's tree frogs, barking and spotted marsh frogs recorded.
Bala (Eulimbah) Swamp	Full. Channel and lignum wet		Large number southern bell frog calling and some detected in surveys. Small number smelt and carp gudgeon. One golden perch. Carp, gambusia, oriental weather loach, yabbies, shrimp and goldfish were caught. One adult southern bell frog and southern bell frog and <i>Limnodynastes</i> sp. tadpoles caught.
Bayil (Telephone) Creek	Full		Three eastern long-necked turtles, smelt, carp gudgeon, shrimp, yabbies, carp, gambusia, goldfish and oriental weather loach. Southern bell frogs calling.
Waugorah	Full/ overflowing into second wetland		Southern bell frog tadpoles caught in net for the first time at this site. Large numbers of carp gudgeon, some smelt, bony bream, shrimp, yabbies, carp, gambusia, oriental weather loach and goldfish. One broad-shelled turtle.
Piggery	Full		Not surveyed, inaccessible due to high water levels
Two Bridges	Full		Not surveyed, inaccessible due to high water levels
Mercedes	Full		Not surveyed, inaccessible due to high water levels
Yanga Lake inflow	Full		Carp gudgeon, bony bream and flat-headed gudgeon. Carp, goldfish and oriental weather loach. Yabbies, shrimp, an eastern long-necked and broad-shelled turtle.
Uara creek	Full		Carp gudgeon, bony bream, carp, gambusia, oriental weather loach. Yabbies, shrimp and Macquarie River turtle.
Shaws wetland	Full		Carp gudgeon, yabbies, shrimp in small numbers. Carp goldfish, gambusia and oriental weather loach. One eastern long-necked turtle. Many tadpoles including <i>Limnodynastes</i> spp., Peron's tree frog and giant banjo frog.
Yanco Creek system			
Rhyola	Wetland	Full	No fish caught, shrimp and tadpoles in small numbers. Diverse waterbirds.
	Paired	Full	Not surveyed, recent rains prevent access
Wanganella	Wetland	Full	One unspotted hardyhead, one Murray-Darling rainbow fish, small catch of smelt, carp gudgeon, redfin, yabbies, shrimp and oriental weather loach.
	Paired	Low 60cm	Nets set in Forest creek near junction with Billabong creek. Ten golden perch, one silver perch, 65 Murray-Darling rainbowfish. Abundant larval fish, several carp gudgeon, carp and shrimp caught. Two eastern long-necked turtles.

Broome	Wetland	$\frac{3}{4}$	Three Murray-Darling rainbow fish, carp gudgeon, yabbies, carp, gambusia, oriental weather loach and shrimp. 25 redfin perch. Two Macquarie River turtles. Southern bell frogs not detected despite being detected in January 2020 surveys.
	Paired	Full	Nets set in Yanco creek, downstream of wetland. 22 Murray-darling rainbowfish, carp gudgeon, yabbies, shrimp, carp, oriental weather loach and 19 redfin perch.
Bundure	Wetland	Full	8 Murray-Darling rainbowfish, carp gudgeon, yabbies, carp, oriental weather loach and shrimp caught.
	Paired	Full	Nets set in Yanco creek, carp gudgeon, shrimp, yabbies, carp, and gambusia.
China	Full	Depth loggers and bat call recorders deployed at sites early August 2021. Data downloaded during September and October. Call recorders will be downloaded and redeployed again in January 2022. Rakali monitoring ongoing across all sites.	
Quiamong	$\frac{1}{2}$		
Hartwood	Full		
Wangamong Creek	$\frac{1}{2}$		
Mundoora	Full		
Cocketgedong	Full		
The Yanco	Full		
Coonong	Full		
Sheepwash	Full		
New Era	Full		

Key outcomes

Routine wetland monitoring activities targeting vegetation, water quality, fish, frog and tadpoles were completed at four sites in the mid Murrumbidgee, eight sites in the lower Murrumbidgee and eight sites in the Yanco creek system. Water levels were high across all sites due to above average rainfall in 2021. Piggery, Mercedes and Two Bridges were not accessible during this survey period due to high water levels.

Wetland fish:

Total numbers of fish recorded were moderate to high at most sites. Native fish captures were dominated by carp gudgeon and Australian smelt. Small native fish, including Murray-Darling rainbow fish, flat-headed gudgeon and Australian smelt, were regularly recorded across all mid and lower Murrumbidgee sites. Bony bream, unspotted hardyhead, silver perch and golden perch were detected during this survey period including a large catch (n =10) of golden perch in Forest Creek near Wanganella. Exotic fish were dominated by juvenile carp, with large gambusia and oriental weather loach recorded at most wetlands. Redfin perch were detected at sites in the YCS including 19 caught in the Yanco Creek at Broome. Carp and goldfish were detected at Sunshower Lagoon despite no detection in 2020/21 after the installation of a large fish exclusion screen. These recent findings indicate small exotic fish species are still able to be introduced to this wetland via the pumping infrastructure.

Frogs and tadpoles:

In the mid and lower Murrumbidgee, frogs were heard calling at most wetland sites across the survey regions in December 2021. All six frog species were recorded calling across the sites, however diversity varied between sites with southern bell frogs (*Litoria raniformis*, EPBC Act listed as Vulnerable) heard at Nap Nap Swamp, Bayil Creek, Bala Swamp and Banim Swamp in Gayini Nimmie-Caira. Southern bell frogs were detected at Waugorah and Shaws in Redbank.

Southern bell frog tadpoles were caught in fyke nets at Nap Nap Swamp, Banim Swamp and Bala Swamp. Giant banjo frog, Peron's tree frog and *Limnodynastes* sp. tadpoles were also caught across multiple sites in the lower Murrumbidgee. In the Yanco Creek system, *Limnodynastes* sp., giant banjo frog and Peron's tree frog tadpoles were captured in nets.

In the Yanco Creek system, frog species detected included Peron's tree frog, giant banjo frog, spotted marsh frog and eastern sign-bearing froglet. No southern bell frogs were detected despite being recorded during targeted surveys in January 2020. Landholders also report not having heard them calling this season.



Un-specked hardyhead at Wanganella swamp, December 2021. Photo credit: Anna Turner



One of the ten golden perch caught in Forest Creek near junction with Billabong Creek north of Wanganella swamp, December 2021. Photo credit: Andrea Mitchell

Turtles: Small numbers of turtles were recorded across sites in the mid and lower Murrumbidgee and the YCS. Eastern long-necked turtles were the most commonly recorded species. Eastern long-necked turtles are recorded at McKennas Lagoon, Gooragool Lagoon, Waugorah Creek, Bayil Creek, Yanga Lake inflow, Shaws and Wanganella Swamp. One broad-shelled turtle was detected at Waugorah Creek and Yanga Lake inflow. One Macquarie River turtle was caught at Uara Creek. Gooragool was busy with turtles with one Macquarie River and three broad-shelled turtles caught in the large nets. Broad-shelled and Macquarie River turtles were detected in the river site at Rhyola.



Eastern long-necked turtle (*Chelodina longicollis*) caught on Billabong Creek near Wanganella Swamp, December 2021. Photo credit: Anna Turner



Indigenous work experience student, Kai Hearne, teaching us about scar trees and the use of coolamon's at Yanga National Park, December 2021. Photo credit: Anna Turner

Wetland birds:

Highlights include hundreds of nankeen night heron's flying over during evening net setting at Shaws wetland. High waterbird diversity was seen throughout mid and lower Murrumbidgee. Little pied cormorant, intermediate egret, Australian white ibis, dusky moorhen, Pacific black duck, sacred kingfisher, straw-necked Ibis, white-necked heron, white-faced heron, great cormorant, Australian wood duck, Australian pelican, Eurasian coot, grey teal and royal spoonbill in the mid Murrumbidgee. Additional species observed in the lower Murrumbidgee include whiskered tern, nankeen night heron, black-tailed native hen and Australian reed warbler.

In the Yanco creek system, waterbird diversity was considerably lower with the most diversity observed at Rhyola wetland and Wanganella Swamp. Wanganella Swamp did not have as high diversity as October surveys, however Rhyola (recently filled) had great numbers and diversity including pink-eared ducks (20), Australasian coot (20), black swans, black winged stilt, red-kneed dotterels and yellow-billed spoonbill. At Bundure wetland a cacophony of Australian reed warblers was heard.

Wetland vegetation:

Wetland vegetation surveys were conducted in November 2021 and reported on in field report number 9. Vegetation surveys are planned to go ahead in January and March 2022.



Diverse aquatic vegetation at Wanganella Swamp, December 2021. Photo credit: Anna Turner