

Rehabilitation of the Nimmie-Caira

Ross E. Hardie¹, Jonathan Ho¹

¹ Alluvium Consulting Australia, 105-115 Dover Street, Cremorne VIC 3121. Email: ross.hardie@alluvium.com.au

Key Points

- The Nimmie-Caira irrigation area was purchased in 2013 under a Heads of Agreement between the NSW and Australian Governments
- The water entitlements are now held by the Australian Government, and the land held by the NSW Government
- A Land and water management plan (LWMP) has been developed to guide long-term management of the Nimmie-Caira aimed at protecting, maintaining and enhancing the ecological resources and Aboriginal Cultural Heritage of the property, without the need for ongoing government investment in the management of the land and cultural values
- An alternate delivery model has been established for the Nimmie-Caira with a non-government entity appointed to manage the land and Aboriginal Cultural Heritage in accordance with the LWMP, while government will be responsible for the supply and delivery of environmental water

Abstract

In 2013 the land and associated water rights of the Nimmie-Caira irrigation area were purchased under a Heads of Agreement between the Australian and NSW Governments. The 85,000 ha site is located in the Lowbidgee area of NSW and abuts the Murrumbidgee River and Yanga National Park. The Nimmie-Caira contains extensive water bird rookeries, wetlands and red gum forests together with significant Aboriginal cultural values. The irrigation area and water rights were purchased to protect, maintain and enhance the Nimmie-Caira environment, relax constraints on water delivery and help meet sustainable diversion limits established for the Murrumbidgee Valley. The land has been retained by the NSW Government while the water entitlements have returned to the Australian Government as part of the program of environmental water recovery under the (Murray-Darling) Basin Plan. A non-government entity (NGE), has been appointed by the NSW Government to provide the long-term management of the property based on an agreed Land and water management plan (LWMP). The LWMP provides direction to the NGE on agreed outcomes sought by investors and stakeholders in the Nimmie-Caira. The LWMP sets out the proposed governance arrangements for the property, land and water management arrangements for seven land and water management units established for the property, the provision for over 300 individual works to modify the existing water management infrastructure, and a monitoring, evaluation, reporting and improvement (MERI) program.

Keywords

Nimmie-Caira, Lowbidgee, land and water management, water management infrastructure, environmental water, alternate delivery model, MERI.

Introduction

The Murray-Darling Basin is the largest and most developed river system in Australia. Since the 1900s, the water resources of its rivers and streams have been regulated and diverted for irrigation and other uses. The regulation and diversion of water has reduced the water availability for instream, adjoining and downstream ecosystems, leading to widespread ecological degradation. The Murray-Darling Basin Plan (Basin Plan), developed under the Water Act 2007 (Commonwealth), was established to address ecosystem degradation by purchasing water entitlements and returning water to the system.

Full Paper

Hardie, R.E. – Rehabilitation of the Nimmie-Caira

The Nimmie-Caira is an 85,000 ha property within the Murray-Darling Basin, located on the Lowbidgee floodplain of the Murrumbidgee River in south-western NSW. Prior to 2013 the Nimmie-Caira comprised 19 irrigated agriculture properties. However, the Nimmie-Caira also contains extensive water bird rookeries, wetlands and red gum forests, as well as rich Aboriginal cultural heritage. It is also immediately east and upstream of Yanga National Park, established in 2007.

The land and associated water rights for the Nimmie-Caira were purchased in 2013 under a Heads of Agreement between the Australian and NSW Governments. The land has been retained by the NSW Government, and a non-government entity (NGE) recently appointed to provide long-term management of the property. Meanwhile, the water entitlements have been returned to the Australian Government as part of water recovery under the Basin Plan.

The Nimmie-Caira Enhanced Environmental Water Delivery project (the Nimmie-Caira Project) was established to protect, maintain and enhance the Nimmie-Caira environment, including its existing ecological values. It is also intended to relax constraints to water delivery and help meet the sustainable diversion limits (SDLs) in the Murrumbidgee Valley. SDLs are being developed under the Basin Plan and determine how much water can be used (diverted) in the Murray-Darling Basin. The SDL's are intended to ensure that there is enough water to keep the river system and groundwater resources healthy.

In 2016, the NSW Department of Primary Industry – Water (now the NSW Department of Industries – Lands and Water Division) appointed Alluvium Consulting Australia Pty Ltd (Alluvium) to develop a business case for the modification of the water infrastructure in the Nimmie-Caira. In 2017, Alluvium was appointed in conjunction with Palladium to undertake a market engagement program to appoint an NGE to manage the Nimmie-Caira. This engagement included the development of a Land and water management plan (LWMP) to guide the long-term management of the Nimmie-Caira. In 2018, Alluvium was appointed by the NSW Department of Industry – Lands and Water Division (DOI) to document the conceptual design arrangements for the proposed water infrastructure modifications

This paper summarises the objectives, constraints and outcomes of the LWMP and discusses an alternate model for the management of environmental outcomes in the Murray-Darling Basin.

Site description

The Nimmie-Caira Project site is shown in **Error! Reference source not found.** It is a semi-arid floodplain system within the NSW Riverina bioregion. The land comprises 19 former farming properties (including dwellings and homesteads), public road reserves, and irrigation channels and related irrigation and floodplain management infrastructure.

The Nimmie-Caira is a 'boom and bust' environment that is subject to both regulated and unregulated riverine inundation. The landscape can be quite productive following natural flooding and through the delivery of irrigation water, but in dry times it is hostile to most farming activities. This hostile environment is the result of the semi-arid climate with variable rainfall and high evaporation rates, and the nature of the heavy clay soils that dominate most of the Nimmie-Caira. Furthermore, the floodplain environment is subject to large periodic natural flood events that inundate extensive areas of the landscape.

Aboriginal occupation of the region dates back around 50,000 years. The Nimmie-Caira falls within an area identified as within the boundaries of the Muthi Muthi and Nari Nari linguistic groups. The Nimmie-Caira contains significant Aboriginal cultural heritage, documented through detailed work undertaken by DPI-Water in 2014 and ongoing assessments for interim land management works. This heritage includes a high number of human remains, which are both culturally and scientifically significant. Known Aboriginal sites are located on the floodplain and near creeks and rivers, and there are indications that there is high potential for unrecorded sites to be present.

Full Paper

Hardie, R.E. – Rehabilitation of the Nimmie-Caira

Environmental values remain in place and or have been established across the landscape. Intact values include remnant vegetation communities including shrublands, and black box and red gum forests. In addition, the site includes significant wetlands and extensive colonial nesting bird rookeries. Many of the wetlands and rookeries have been modified as a result of the agricultural development, including the clearing of land and the construction of water storages. The constructed water storages, in particular, Eulimbah and Telephone Bank, have become important water bird rookeries. The property has also become a refuge for the endangered Southern Bell Frog.

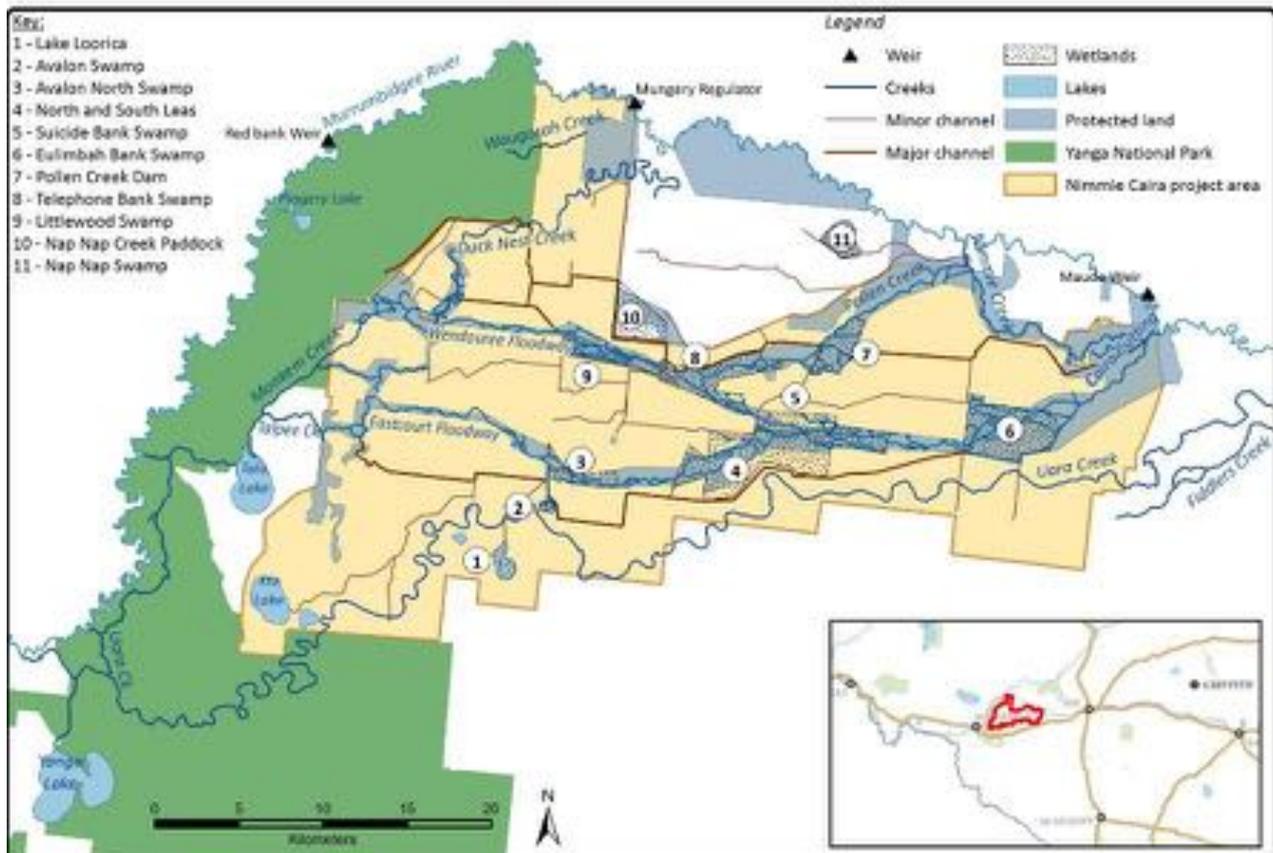


Figure 1. The Nimmie-Caira project site

The Land and water management plan (LWMP)

Objectives of the LWMP and proposed infrastructure modification works

The LWMP and associated water infrastructure modifications are intended to

- provide for the protection, maintenance, and enhancement of the ecological and Aboriginal cultural values of the site.
- contribute to NSW commitments under the Basin Plan SDL adjustment mechanism
- enable the management of the property as a self-supporting landscape, not require ongoing government investment in land and Aboriginal Cultural Heritage management.

The proposed governance, land management, environmental water management, proposed works, Aboriginal Cultural Heritage management and a monitoring, evaluation, reporting and improvement program are all set out in the LWMP.

Land management

The property has been divided into seven land and water management units (LWMU's). The LWMU's reflect the underlying character of the property including the vegetation communities and historic landuse. Alternate levels of conservation and commercial management have been identified for each LWM unit. The greatest environmental protection and hence greatest restrictions on commercial use have been applied to LWMU 1 – Core conservation areas, while the least restrictions on commercial uses have been applied to LWMU 7- Commercial areas. A significant proportion of the property has been allocated to LWMU 7 to enable commercial production, that can support the accompanying ecological and Aboriginal cultural heritage management of the property.

Land management within the LWMU's will be the responsibility of the NGE recently appointed to manage the property.

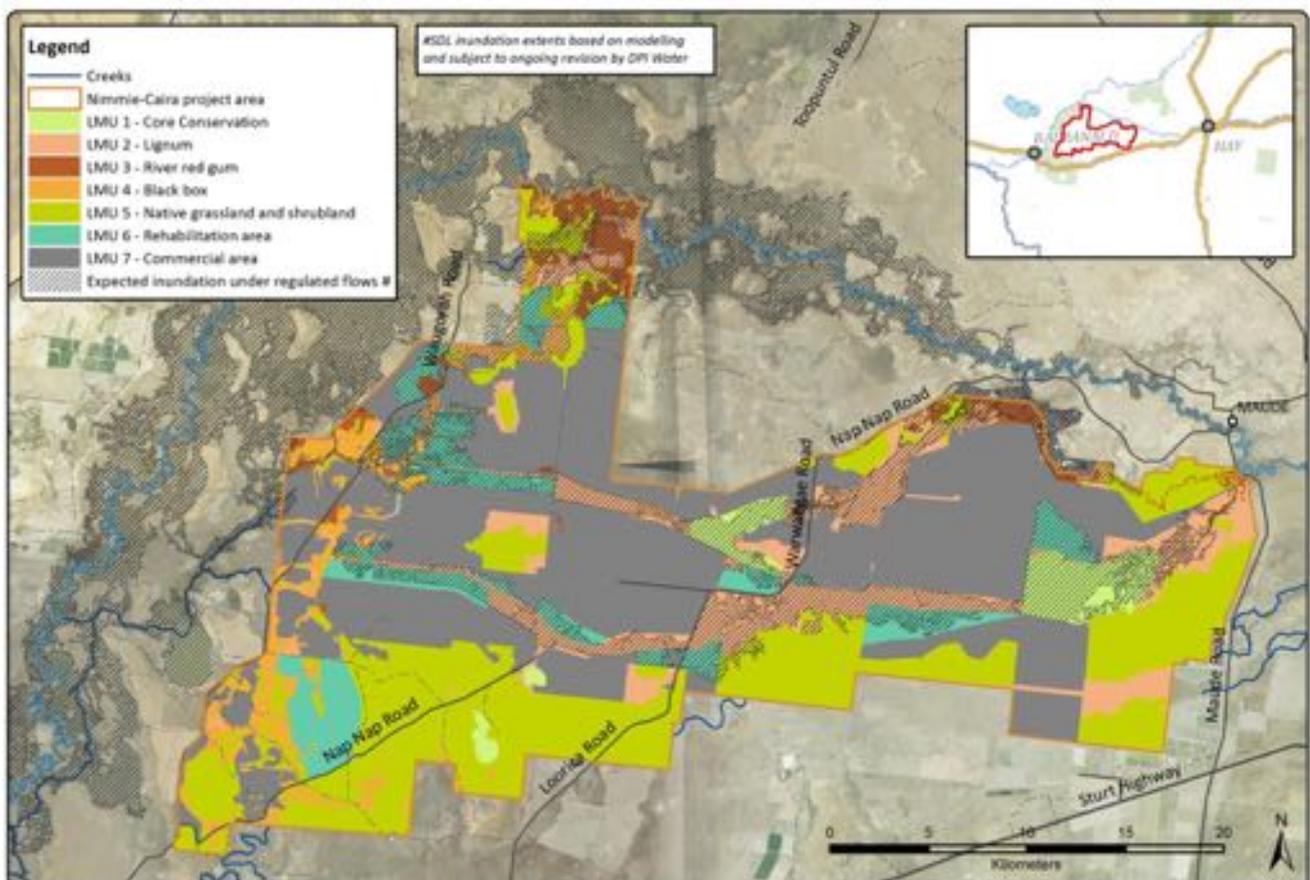


Figure 2. The Nimmie-Caira land and water management units

Environmental water management

The proposed water infrastructure modifications have been configured to enable the supply and delivery of environmental water to and through the Nimmie-Caira. Specific watering objectives have been established for the Basin Plan and the Lowbidgee floodplain. The objective for environmental watering in the Nimmie-Caira under the LWMP have been developed to reflect the needs of the Nimmie-Caira and the environmental objectives and desired outcomes for the Murray-Darling Basin, as outlined in the Basin Plan.

The flow events required for different ecological outcomes are shown in Table 1. It is proposed that these demands be delivered via the existing network of floodways, waterways, and protected lands at the site, and that much of the existing water supply channel network and related infrastructure can therefore be decommissioned. However, some regulators near Maude Weir on the Murrumbidgee River and waterway and storage embankments will need to be retained, to regulate delivery of water into the Nimmie-Caira and

Full Paper

Hardie, R.E. – Rehabilitation of the Nimmie-Caira

to both store water within the existing wetlands and contain water deliveries. Some channels will also need to be retained, to enable effective water delivery across the site.

Capitalising on existing infrastructure will allow environmental watering needs to be met efficiently. Existing embankments across the existing floodways will be adapted to increase the extent and duration of inundation, while the distribution of water will be limited to areas where environmental values are located and where floodplain rehabilitation is most effective.

Table 1. Environmental water delivery

Flow event	Occurrence (% of years event or greater occurs)
Refuge habitat watering (Watering of Southern Bell Frog habitat)	95
Rookery Lignum watering	50
Bird breeding, lignum watering and red gum inundation events	25 (To be confirmed)
Black box inundation events	14

In addition to the benefits within the Nimmie-Caira, the proposed arrangements also provide for more efficient and effective watering of Yanga National Park ecological assets and values than current arrangements. It is proposed that water be delivered to areas of Yanga National Park that are difficult to reach through the existing flow paths. The existing watering arrangements at Yanga National Park result in overwatering of areas that are close to the main supply points from the Murrumbidgee River. The proposed arrangements provide for the integrated watering of the Nimmie-Caira area and Yanga National Park through four natural flow paths (Waugorah Creek, Wendouree Floodway, Eastcourt Floodway and Lower Uara Creek).

The proposal does not include provision to pass significant volumes of water through the Nimmie-Caira to address water delivery constraints in the Murrumbidgee River. Such water delivery would significantly reduce Nimmie-Caira and Yanga National Park environmental outcomes and produce only marginal improvements in water delivery for the Murray Valley.

The supply of water to meet the environmental water requirements of the Nimmie-Caira will be the responsibility of the NSW and Australian Governments.

Proposed water infrastructure modification works

A set of proposed water infrastructure modification works have been developed to achieve project objectives. The proposed works are intended to provide for:

- Environmental water delivery – the proposed water infrastructure modifications will enable the supply and delivery of environmental water demands to and through the Nimmie-Caira (discussed below);
- Flood passage and flood security – it is proposed that the water infrastructure should not be severely impacted in large flood events;

These proposed works must be undertaken within the constraints of the project and the site, including:

- Budget – the NSW DOI has a defined budget for the proposed works;
- Impacts to ecological values – the proposed works are to not have a significant adverse impact on existing ecological values of the site, such as the Southern Bell Frog;
- Impacts to Aboriginal cultural values – the proposed works are not to have a significant adverse impact on Aboriginal cultural values of the Nimmie-Caira.

Full Paper

Hardie, R.E. – Rehabilitation of the Nimmie-Caira

The proposal includes over 300 individual works, including:

1. Storage embankments – water storage embankments are typically aligned across the flow path and serve to create a storage or wetland. Water control regulators are proposed for inclusion in these embankments. It is proposed that five embankments (Eulimbah, Suicide Bank, North and South Lees, Avalon North, and Telephone Bank) be reconstructed to contemporary design and construction standards. The embankments currently support important lignum wetlands and colonial nesting bird rookeries.
2. Regulator gates – regulator gates are required at the storage embankments to manage discharge of regulated environmental flows. It is proposed that some of the storage embankment regulators have the capacity to discharge flows of up to 2,500ML/day.
3. Waterway embankments – waterway embankments have been proposed to confine the regulated flow events to a restricted portion of the floodplain. It is intended that these embankments confine environmental flows to maximise the return for environmental outcomes and prevent the watering of LWMU 7 – Commercial areas) with environmental water.
4. Embankment removal and lowering – Numerous levees and embankments have been constructed across the property to limit and control flood water and regulated flows. The existing levees and embankments are not licensed structures. It is proposed that;
 - some embankments be completely lowered to enable the free passage of flood water across the landscape;
 - most embankments have cuts installed to enable the passage of flood water across the landscape (these cuts are typically 50 m in length),
 - any existing cuts in embankments are modified to allow passage of flood water, which involves widening to 50 m and shaping to specification (modifications to approximately 150 existing cuts are proposed).
5. New channels – Two new channels are proposed. The new channels are required to enable the discharge of regulated flows of up to 2000 ML/d from Maude Weir to the Eulimbah wetland.
6. Upgrades to existing channels – upgrades are proposed for three channels to ensure capacity, including:
 - the North Caira Channel, South Caira Channel supplying water to Eulimbah wetland in association with the two new channels, and
 - the Kia Ora Channel, supplying water to wetlands near and within Yanga National Park

The implementation of these works will be the responsibility of the NSW DOI

Aboriginal Cultural Heritage management

The NSW DOI and predecessor organisations have implemented an Aboriginal Engagement Strategy (AES) to accompany and inform the development of the LWMP. The local Aboriginal community agreed to work towards establishing a Nimmie-Caira Alliance of Aboriginal Peoples, or equivalent, to present a united voice, in joint-decision making around local Aboriginal Cultural Heritage on the Nimmie-Caira.

The AES process resulted in the community expressing four key thematic aspirations for the Nimmie-Caira:

- Local Aboriginal communities define ‘enhance’ as relating to the strengthening of local Aboriginal culture, as a living culture, including but not limited to activities related to healing, education, employment, men’s business, women’s business, and ceremonial activities.

- Traditional Owners seek to ensure access to Nimmie-Caira for all Aboriginal and Torres Strait Islander peoples; for employment opportunities and for other activities described in the vision. Traditional Owners also seek ownership of the Nimmie-Caira.
- Access for all Aboriginal and Torres Strait Islander peoples may be conditional and should be well managed and should include the ability to camp or temporarily reside for Aboriginal cultural activities, healing or education, on areas either at nominated existing built infrastructure or in traditional camp areas. Aspirations for hunting on Nimmie-Caira have also been raised by the community and it is recognised that any such activity would need to be carefully managed and controlled.
- Local Aboriginal communities would like to contribute their land management skills and traditional knowledge and practices to support the NGE’s ability to meet the environmental and Aboriginal Cultural Heritage minimum requirements on Nimmie-Caira.

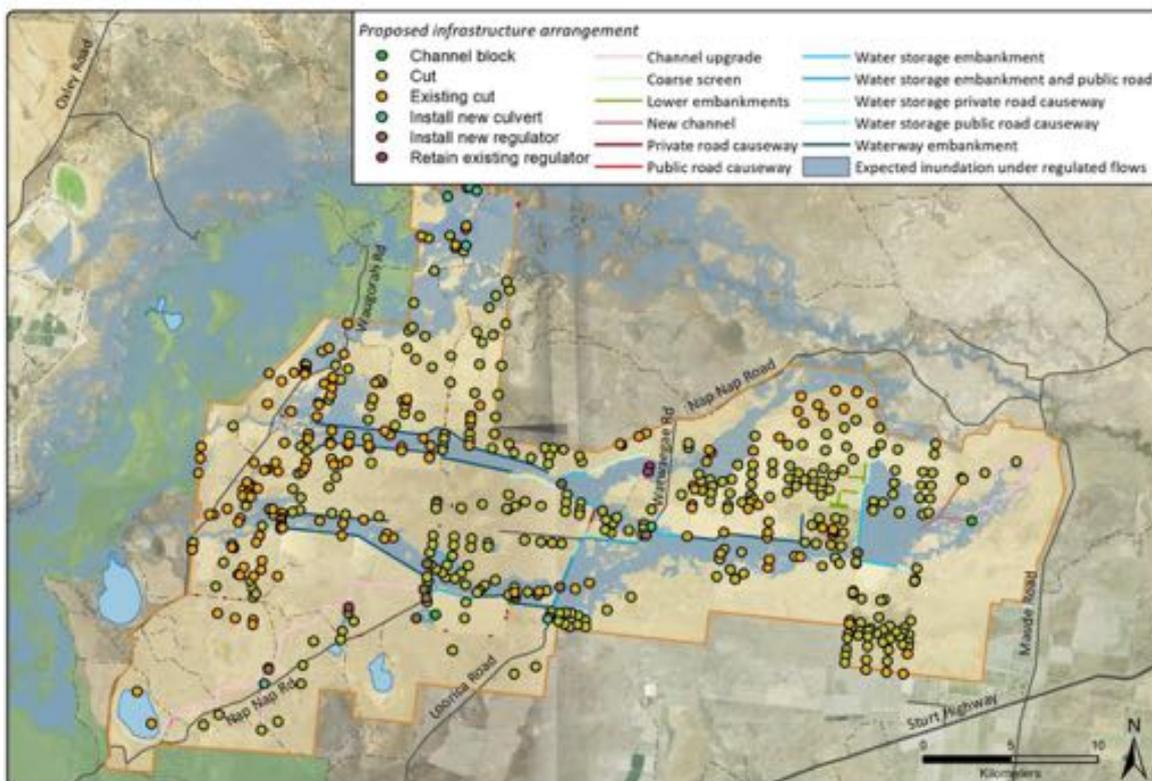


Figure 3. Location of proposed works at the Nimmie-Caira

Monitoring, evaluation, reporting and improvement

A monitoring, evaluation, reporting and improvement (MERI) plan has been developed for the property. The purpose of the MERI plan is to provide assurance of the outcomes of the LWMP.

The MERI plan has been developed to be consistent with the monitoring and evaluation framework for the Basin Plan, the Basin-wide Environmental Watering Strategy (BWS; MDBA 2014) and the Murrumbidgee Long Term Water Plan (LTWP; OEH 2017b). It also aligns and complements the monitoring activities in the broader Lowbidgee and Yanga, undertaken by the CEWO, OEH and National Parks and Wildlife Service (NPWS). While the MERI plan for the Nimmie-Caira LWMP will strive for consistency and alignment with existing programs, it cannot rely on them for its success and will need to be adaptive and flexible to respond to potential structural changes in broader MERI frameworks.

The LWMP and the MERI plan itself are intended to be adaptive and (with the relevant approvals) the initial requirements set out in the LWMP may be revised as knowledge improves. The MERI plan includes a program logic setting out pathways leading from the implementation of activities and works to the attainment of

agreed long term outcomes and objectives for the property. The MERI Plan also includes a set of key evaluation questions, against which the project can be assessed. Key evaluation questions for the Nimmie-Caira project are set out in Table 2.

Table 2. Nimmie-Caira key evaluation questions

#	Key evaluation question	Type of evaluation
1	To what extent did the program activities improve the environmental values of the Nimmie-Caira?	Impact and effectiveness
2	To what extent did the program activities improve the Aboriginal Cultural Heritage values of the Nimmie-Caira?	Impact and effectiveness
3	To what extent did the program activities create economic value from the Nimmie-Caira and contribute to regional economic outcomes?	Impact and effectiveness
4	To what extent were the initiatives of the LWMP appropriate in achieving the objectives?	Appropriateness
5	What could be improved to maximise (or minimise where appropriate) the impact of the LWMP	Efficiency
6	How could LWMP activities be delivered more efficiently and effectively	Efficiency

Delivery of the MERI plan will be the joint responsibility of the NGE and the NSW Government.

Discussion

A LWMP has been developed to guide the long-term management of the Nimmie-Caira. The implementation of that management plan and the accompanying MERI Plan will be the joint responsibility of the NGE, appointed to manage the land, and government, responsible for both the supply and delivery of environmental water and the modification of the watering infrastructure.

This model for natural resource management comes with some risk. The model is reliant on each stakeholder responsible for the implementation of the LWMP, implementing activities and works in accordance with the LWMP and or all stakeholders agreeing to modify the LWMP based on improved learnings. Failure to actively co-operate in the delivery of the LWMP will result in a failure to deliver on the LWMP and failure to protect, maintain and enhance the ecological and Aboriginal cultural values of the Nimmie-Caira.

However, this combination of government and non-government sectors working together to achieve a common goal capitalises on the strengths of government and the non-government sectors. With government providing basin scale water resource planning and delivery and the non-government sector providing for the on-ground management of the land and Aboriginal cultural values.

The success of the LWMP, the proposed works and the MERI Plan will lie in the willingness of stakeholders to work together to achieve a common agreed outcome. The arrangement has the potential to provide for the effective delivery of waterway and water resource programs elsewhere in the Murray-Darling Basin and elsewhere across Australia.

References

Alluvium 2015. Nimmie-Caira Infrastructure modifications proposal Phase 2 SDL adjustment assessment. Report for Department of Primary Industries, NSW Office of Water. Alluvium Consulting Australia.

Alluvium 2018. Nimmie-Caira Water Infrastructure Modifications – Technical Specification

NSW Department of Industry, Lands and Water Division, 2018. Nimmie-Caira Land and Water Management Plan, report prepared by Alluvium Consulting Australia for NSW DoI.

Murray-Darling Basin Authority (MDBA) 2012c. Assessment of environmental water requirements for the proposed Basin Plan: Lower Murrumbidgee River Floodplain, MDBA Publication No:39/12. Murray-Darling Basin Authority, Commonwealth of Australia, Canberra.