

Chapter 1 – General information

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1 General information

1.1 Introduction

This Public Environment Report (**PER**) has been prepared for the Commonwealth Department of the Environment, Water, Heritage and the Arts (**DEWHA**) for the assessment and approval of an action that may have an impact upon Matters of National Environmental Significance (**MNES**) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (**EPBC Act**).

On the basis of a referral accepted on 6 October 2009, DEWHA determined on 6 November 2009 that the proposed action, which is described in Section 1.2 below, is a controlled action requiring approval under the EPBC Act, and that it is to be assessed through a PER.

The controlling provisions under the EPBC Act were determined to be:

- wetlands of international importance (sections 16 and 17B)
- listed threatened species and ecological communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A).

A copy of the decision can be found at Appendix 1.

Guidelines for the PER were issued by DEWHA on 24 December 2009. A copy of the Guidelines appears at Appendix 2.

1.2 Background of the action

1.2.1 Title of the action

The proposed action is the modified operation of the fully modernised Goulburn Murray Irrigation District (**GMID**) in northern Victoria. The modified operation is the product of the application of modern technology to the delivery of irrigation water, including channel automation and electronic metering.

1.2.2 Objective of the action

Modernisation will improve the currently poor 70% water efficiency of the publicly-owned irrigation system in the GMID to a world class water efficiency of at least 85%. Modernisation has two core objectives:

- increased efficiency of water resources delivering of up to 425 GL (long term annual average) water savings to provide water for:
 - the environment (up to 175 GL long term annual average)
 - irrigators (up to 175 GL long term annual average)
 - Melbourne (up to 75 GL long term annual average)

- increased viability of northern Victorian irrigators and support for regional development in the context of reduced water availability and climate change.

In addition to the delivery of up to 175 GL water entitlements to the environment, additional environmental objectives are outlined by both the State and Commonwealth Governments.

The project is funded by the Commonwealth and Victorian Governments, Melbourne Water and irrigators. The key objectives of both the Commonwealth and Victorian Governments are consistent and closely align to each other and to the core objectives of modernisation. The respective Commonwealth and Victorian objectives are outlined below.

The key Commonwealth Government objectives are to:

- deliver substantial volumes of permanent water savings to be used to protect and restore the riverine environment of the Murray Darling Basin
- secure a sustainable long-term future for irrigation communities in response to the problems of reduced water availability, climate change and salinity, through an investment in the cost effective upgrade of water infrastructure
- provide value for money in context of the objectives of the National Water Initiative (**NWI**) and *Water Act* (2007) reforms
- help irrigation communities make early adjustments in anticipation of the new Murray Darling Basin cap on water extractions by empowering irrigators to use water more efficiently.

The key Victorian Government objectives are to:

- complete the modernisation of the GMID channel system and save up to 425 GL of water losses to be shared between:
 - the Commonwealth (up to 200 GL long term average annual to be shared between irrigators and the environment)
 - irrigators (up to 75 GL long term annual average excludes Commonwealth share)
 - the environment (up to 75 GL long term annual average excludes Commonwealth share)
 - Melbourne urban water users (up to 75 GL long term annual average)
- increase GMID productivity, profitability and water use efficiency by providing an improved level of water delivery service through a modernised irrigation system
- deliver a financially viable irrigation system by ensuring that the recurrent costs of operating and maintaining the irrigation scheme are affordable and avoid stranded irrigation assets

- improve the health of the northern Victorian rivers, floodplains and wetlands
 - provision of up to 75 GL of callable, tradable environmental entitlements
 - reduction in the environmental footprint of the irrigation system
 - retention and, where possible and practical, the enhancement of infrastructure to deliver environmental water
- minimise social disruption by providing certainty to irrigation communities through coordinated planning between the State and Commonwealth Governments
- provide value for money for investors in infrastructure modernisation:
 - in the delivery of the modernisation project and securing of water savings
 - coordinating the buyback of water entitlements with infrastructure modernisation by assigning priority to buyback from low productivity, environmentally damaging zones which do not have a long term sustainable irrigation future
- secure a sustainable future for the regional irrigation community of the GMID, Australia's largest irrigation system, in the context of reduced water availability and climate change.

The objectives outlined above for the modernisation project and operations of the fully modernised GMID are consistent with the State's long term policy direction for water resource management outlined in further detail in Section 1.2.6.

1.2.3 Proponent

The proponent is the State-owned Enterprise for Irrigation Modernisation, trading as the Northern Victoria Irrigation Renewal Project (**NVIRP**). NVIRP was established by the Victorian Government to implement the recommendations of the Food Bowl Modernisation Steering Committee (**FMSC**) following its report (FMSC 2007) to the Victorian Minister for Water in November 2007. Further detail of the work of the Food Bowl Modernisation Steering Committee is provided in Chapter 11.

The public irrigation infrastructure is owned by Goulburn-Murray Water (**G-MW**), which manages the GMID water supply infrastructure and will be the ultimate manager and operator of the modernised system.

The proponent's details are:

Organisation	State Owned Enterprise for Irrigation Modernisation in Northern Victoria, trading as Northern Victoria Irrigation Renewal Project (NVIRP) (ABN: 65 247 206 350)
Contact person	Murray Smith
Position	Chief Executive Officer
Postal address	PO Box 1665, Shepparton, VIC 3632
Telephone	1300 163 006
Email	waterforgrowth@nvirp.com.au

1.2.4 Outline of the action

The modified operation of the irrigation system in the GMID and associated Water Districts around the GMID periphery will employ modern technology to exercise greater control over the water resource and reduce incidental water losses.

The irrigation delivery system in the GMID and surrounding areas has deteriorated with age, leading to large-scale inefficiencies, unplanned water losses and a lack of appropriate water accountability. Approximately 30% of the water diverted for irrigation is not delivered for its intended use, instead being lost in the delivery system through leakage, seepage, outflows within the channel system, meter error and other system inefficiencies. The lost water often evaporates or ends up as non-managed drainage. Modernised operation using selectively remodelled and/or lined channels, piping, upgraded metering and automated delivery systems, and rationalisation of redundant channels, can stem these losses and enable the recovered water to be used for irrigation, the environment and potable water supply.

In addition, the current configuration of the irrigation infrastructure in the GMID has not changed substantially since it was originally constructed. Property sizes were typically small with large sections of the GMID dominated by soldier settlement schemes. Each of these small properties was provided with a service point from the irrigation network. Farm sizes have increased through amalgamation over the past fifty years leading to multiple service points on many properties. Rationalisation of service points will enable water to be supplied through a less extensive backbone of public irrigation supply channels with a smaller surface area subject to evaporation, seepage, leakage and unauthorised losses.

Of the long term annual average water savings of up to 425 GL achieved through lifting the efficiency of the system from 70% to 85%, 75 GL on average will be diverted to Melbourne for water supply purposes, 175 GL will be allocated to the environment and 175 GL will be allocated to irrigators. With the exception of the 75 GL to Melbourne, the effect of NVIRP will be to harvest and redirect water which is currently 'lost' through outfalls, leakage, seepage, evaporation and inaccurate metering to the environment and irrigators. Water savings are calculated after water has been allocated to manage any impacts on high environmental values, including MNES.

The use of this water will increase agricultural productivity and assist in the targeted protection of high value environmental assets.

As set out in the Guidelines, the action does not include:

- all construction works
- reconfiguration works within the Kerang Wetlands Ramsar site.
(Reconfiguration of the Kerang Wetlands includes physical works to bypass flows around the wetlands to change the use of the wetlands as an integrated part of the irrigation system in order to reduce system losses and allow for better environmental management. Any hydrological effect from the operation of the modernised system on both surface and groundwater within the vicinity of the Kerang Wetlands Ramsar site has been considered within the referred action)
- reconfiguration of the Little Murray Weir and modernisation of the irrigation system in the vicinity of the rural city of Swan Hill
- administrative decisions on the allocation of resulting water savings.

These are either outside the jurisdiction of the *EPBC Act* (the administrative decisions), not significant in their potential impacts on MNES (the construction works), or uncertain to a degree that a separate referral will be made if and when they proceed (reconfiguration of the Kerang wetlands and the little Murray Weir and modernisation in the vicinity of Swan Hill). Notwithstanding this, the effects of the overall modernisation on the Kerang Lakes are included in the action and the current status with respect to decision-making on Kerang, the little Murray Weir and Swan Hill is set out (for information only) in Chapter 3.

1.2.5 Location of the action

The GMID covers approximately 9,000 km² of the 68,000 km² that is managed by Goulburn-Murray Water and is a system of streams, creeks, rivers and channels that is controlled by operators who store rainfall and/or tributary flows in water storages and release it as required.

The location of the GMID is shown in Figure 1-1.

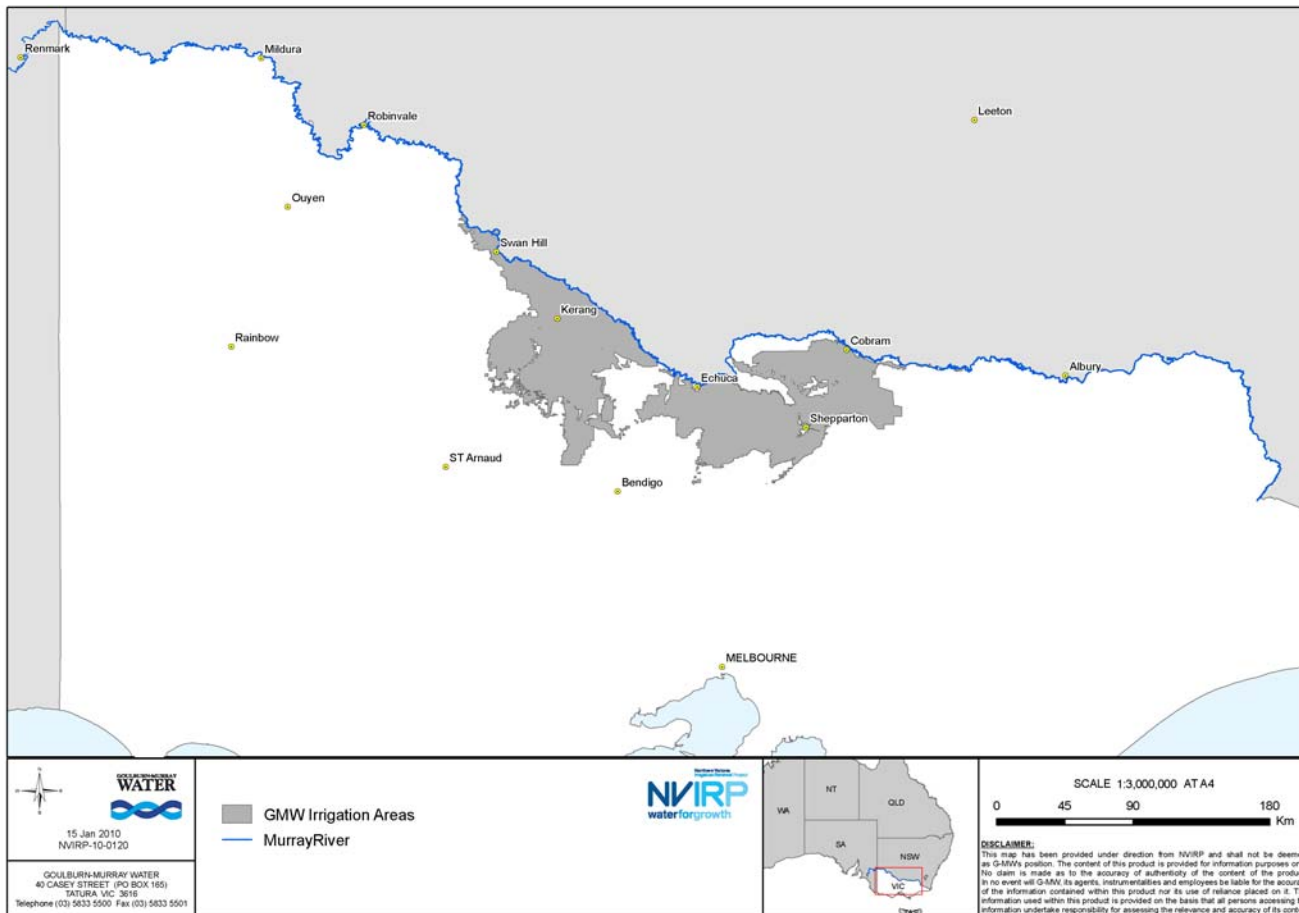


Figure 1-1: Location of the GMID

The six Irrigation Areas in the GMID are Shepparton, Central Goulburn, Rochester-Campaspe, Pyramid-Boort, Murray Valley and Torrumbarry. Also included in the project area are the associated Water Districts (Tungamah, East Loddon, West Loddon and Normanville), the Campaspe Irrigation District and the pumped Irrigation Districts of Tresco and Nyah as well as private domestic and stock water supply schemes around the GMID periphery. For the purposes of this assessment, these are included in the GMID.

Figure 1-2 shows the four major rivers and storages supplying water to the six Irrigation Areas of the GMID, namely: the River Murray, Goulburn River, Campaspe River and Loddon River. These are 'working rivers' for the irrigation system in addition to their natural functions as major waterways.

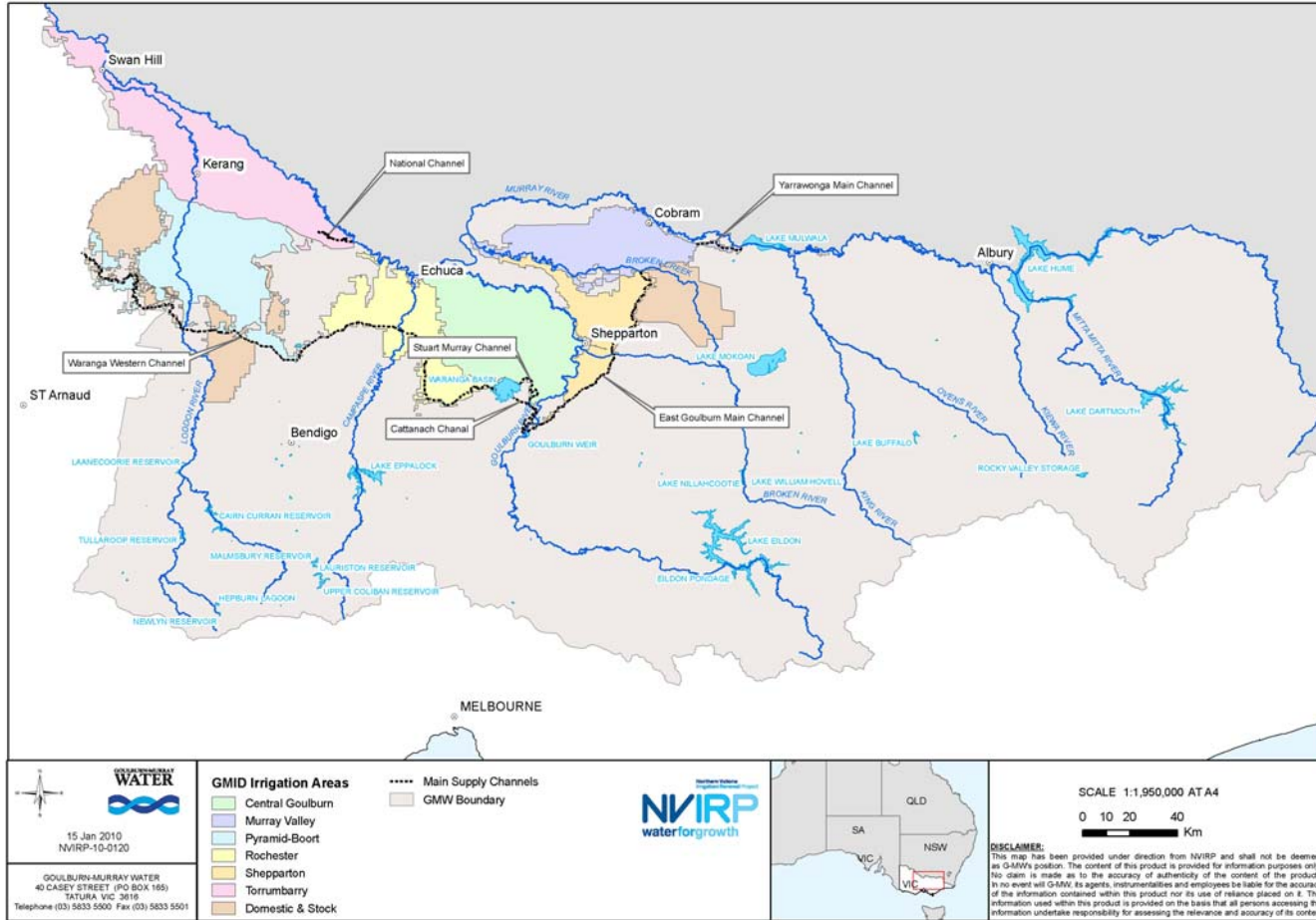


Figure 1-2: Location of the GMID showing the six irrigation areas, major rivers, storages and diversion points

1.2.6 Background to the development of the action

The action is consistent with:

- Victorian water resource management policy
- Food Bowl Modernisation Steering Committee (FMSC) report
- Victoria's Water Plan
- National Water Initiative
- Northern Region Sustainable Water Strategy.

1.2.6.1 Victorian water resource management policy

The policies that underpin and support the action have been in development in Victoria for over 20 years and are consistent with Commonwealth policy direction. The major reforms in Victorian water resource management have been in response to:

- recognition that there are limits to the amount of water that can be diverted and that continuing growth in diversions was impacting on the reliability of supply and river health
- recognition that existing diversions must be used as efficiently and productively as possible
- the need for an active water market to facilitate new investment and allow reallocation of water to higher-value uses, as new entitlements could no longer be granted
- the need for more clearly defined rights to allow easier transfer of entitlements
- the need for more clearly defined rights to environmental water to mitigate the impacts of diversions on river and wetland health.

The recognition that changes needed to be made resulted in Victoria passing the *Water Act* 1989 (Vic), developing a water market (1992), development of *Our Water Our Future* Green Paper (2003) and White Paper (2004) on water reform and the development of an environmental contribution by water authorities to protect and restore Victoria's water resources. These changes addressed the drivers outlined above by enhancing water markets, clarifying property rights, creating environmental entitlements and recovering water for the environment, managing risks from climate change and investing in water efficiency projects.

Most recently the modernisation project was announced as part of the Victorian Government's *Next Stage of the Government's Water Plan* (DSE 2007), a plan that outlined how Victoria would improve efficiency of water use, share water across interconnected networks and build water infrastructure.

These programs are the next step in the general long term Victorian direction in addressing water resource management issues.

Victoria's approach to improving the management of water resources is consistent with the Commonwealth as evidenced by the Murray-Darling Basin Agreement (1992), Living Murray Agreement (2003), Snowy River Recovery Project (2003) and the National Water Initiative (NWI) (2004), all of which Victoria is a signatory to. The NWI signed at the Council of Australian Governments in June 2004 highlights Victoria's shared commitment to increasing the efficiency of water, creating greater certainty for investment and productivity for rural and urban customers and addressing the over-allocation in the environment (see Section 1.2.6.3).

Consistent with the Victorian and Commonwealth policy in 2000, the Victorian Government commissioned a study to investigate how to reduce water losses from the irrigation distribution systems in northern Victoria (SKM 2000). The resulting report identified means of improving water delivery efficiency, quantified the costs and identified the potential benefits that would flow from achieving optimum water delivery efficiencies.

In the wake of that report, the Victorian Government began assessing the magnitude of available water savings, testing technologies and developing engagement and implementation approaches to achieve the projected efficiencies.

1.2.6.2 Food Bowl Modernisation Steering Committee

The GMID is a hub of food production, producing 26% of the nation's milk, nearly 95% of Victoria's tomatoes by weight, 75% of Victoria's stone fruit by weight and 95% of Victoria's grapes. Irrigated agriculture generates approximately \$1.4 billion in production annually. In the context of a trend towards lower and more irregular rainfall, and the perceived threat to the continuing prosperity of the GMID, the Victorian Government established the FMSC to undertake extensive consultation in the region to determine the best means of achieving system efficiencies (and associated water savings) to underpin agricultural productivity.

In November 2007 the FMSC confirmed to the Victorian Government that strategic investment in irrigation infrastructure was essential to enhance productivity and maintain the growth of food industries in the region.

It stated:

"This is a once in lifetime opportunity to replace the out-dated irrigation infrastructure in the GMID and provide the modern and efficient water delivery services required by 21st century farming operations. In an environmentally sustainable manner, it will provide a competitive advantage for the Food Bowl region, its communities and industries, underpinning the long-term viability of irrigated agriculture across northern Victoria" (FMSC 2007, p.5).

The Victorian Government subsequently established NVIRP to implement the modernisation.

1.2.6.3 Victorian water plan

The Victorian Government's *Our Water Our Future – the Next Stage of the Government's Water Plan* (DSE 2007) aims to provide water security for Victoria's growing population and economy. Irrigation modernisation is one of its five key strategies to provide greater water security for Victoria's economy and environment. In conjunction with the expansion of Victoria's water grid including the Sugarloaf Water Pipeline (see Section 1.2.7.2) and the Victorian Desalination Project, irrigation modernisation in Northern Victoria formed a suite of infrastructure projects announced under the plan, with the combined aims of securing urban water supplies, making water available to currently stressed waterways and sustaining agricultural productivity.

1.2.6.4 National Water Initiative

In parallel with the developments at State level and lending encouragement to the process, the National Water Initiative focused the attention of State governments on the effectiveness of their water resource management and on entitlements as the basis for both water trading and environmental watering. One of the key strategic objectives of the NWI is to return currently flow-stressed systems to environmentally-sustainable levels of extraction, notably through the buyback of entitlements which can be applied as environmental water in the Murray-Darling Basin (**MDB**). The drought of the last thirteen years, and the focus on environmental watering through water recovery initiatives including the Living Murray Initiative, has led the Victorian Government to consider sources from which it might create new entitlements for the environment, in conjunction with new entitlements for irrigators in the Food Bowl and elsewhere in the MDB. Water currently lost through system inefficiencies was identified as a target for recovery and controlled use for these purposes.

A second strategic objective of the NWI is reforming water resource accounting to ensure that adequate measurement, monitoring and reporting systems are in place. Automated operation using new service point meters which accord with new national metering standards is considered desirable to support public and investor confidence in the amount of water being traded, extracted for consumptive use and recovered and managed for environmental and other public benefit outcomes. Many of the water savings from NVIRP derive from the control of unmetered and inaccurate over-supply which has occurred through the ageing water supply system

1.2.6.5 Northern Region Sustainable Water Strategy

The *Our Water Our Future* action plan (DSE 2004a) requires the development of regional sustainable water strategies to plan for long term water security across Victoria. Each sustainable water strategy sets out a long term regional plan to secure water for local growth, while maintaining the balance of the area's water system and safeguarding the future of its rivers and other natural water sources.

The strategy applicable to the GMID is the *Northern Region Sustainable Water Strategy* (DSE 2009a) that was published in November 2009. The strategy includes a chapter on encouraging efficient and sustainable irrigation and a chapter on high-value rivers, wetlands and floodplains with a key action to improve the efficiency of environmental water use. It describes the proposed tools to do more – increase productivity, continue regional development, improve the health of rivers and wetlands – with less water.

One of the guiding principles of the Northern Region Sustainable Water Strategy is that ‘all entitlement-holders need to share the risk of reduced water availability caused by climate change’. The strategy highlighted the importance of providing all entitlement-holders with the certainty and flexibility they need to help manage the water related risks to their enterprises. Flexibility is supported through mechanisms such as the water market and carryover, and certainty through actions such as the reserve policy and modernisation processes. Irrigation modernisation underpins certainty by reducing the amount of water required to operate the distribution system. New entitlements are created from the resulting water savings. The strategy also documents the widely-accepted need to return environmental assets in the region to more natural conditions and outlines water recovery targets to guide the Commonwealth purchase program and the development of the Murray-Darling Basin Plan.

As the most recent, comprehensive review of the environmental needs of the region in the context of sustainable management of the water resource, the strategy is a key reference for understanding and assessing the present action. The strategy is the result of an 18 month collaborative process involving government departments, independent experts, key stakeholders in the water industry and the broader regional community.

A copy of the strategy is available at:
<http://www.ourwater.vic.gov.au/programs/sws/northern/final>

1.2.6.6 Funding

In principle funding for NVIRP is provided by several organisations. These include the Commonwealth *Sustainable Rural Land Use and Infrastructure Program* (as part of the NWI’s *Water for the Future Plan*), the Victorian Government’s *Our Water Our Future- Securing Our Water Future Together* (DSE 2004a) strategy and funding from G-MW and Melbourne Water.

1.2.7 Other related actions

1.2.7.1 Irrigation modernisation projects

Several smaller scale irrigation modernisation projects have been, or are being, undertaken outside NVIRP. Some of these have been undertaken by G-MW and include experimental elements. Within the GMID, these are:

- **Central Goulburn 1234 Channel Automation Project (CG1234)** which has modernised channels and meter outlets in the 1, 2, 3 and 4 channel system within the Central Goulburn Irrigation Area south east of Tatura. This project trialled channel automation on a complex system configuration for the first time, following a two year pilot on the CG2 channel. After automation, leaks and seeps were identified in high-loss channel pools and priority channel sections remediated via lining and farm meter outlets were automated.
- **Woorinen Pipelining** which has upgraded water supply to the Woorinen Irrigation Area through construction of a 294 ML/day pump station adjacent to the River Murray, a 1.3 km rising main and 60 km of distribution mains.
- **Shepparton Irrigation Modernisation Project** automating major channels, replacing meters, reconfiguring channels and replacing some channels with pipelining.

1.2.7.2 Sugarloaf Water Pipeline

The Sugarloaf Water Pipeline is the subject of a separate EPBC approval (2008/3960) obtained by Melbourne Water Corporation and is currently under construction, for projected operation in early 2010. The Sugarloaf Water Pipeline will be used to transfer not more than 75 GL of water savings in any one year from the region to augment Melbourne's water supply.

NVIRP, in conjunction with other projects, provides a source of water savings for the pipeline. No water savings from NVIRP have yet been sent to Melbourne through the Sugarloaf Water Pipeline.

1.2.7.3 Gunbower Forest environmental works project

Feasibility assessments and concept designs have been completed for a Gunbower Forest environmental works project, managed by the North Central Catchment Management Authority (**NCCMA**) with implementation by G-MW as the constructing authority. The aim of this project is to build works which can efficiently water large sections of the forest at regulated river levels (i.e. without overbank flooding), thus securing the forest against reduced water availability and climate change. The project is being supported by funding from the Murray-Darling Basin Authority (**MDBA**) through the Living Murray Environmental Works and Measures Program. The project has two main components:

- the Lower Landscape Works, which will allow inundation of about 2,470 ha, representing approximately 57% of the total wetland area and 13% of the surrounding River Red Gum community
- the Hipwells Road diversion channel option, which will enable flooding of about 4,700 ha, including wetlands and River Red Gum and will enable 30% of Red Gum forest to be maintained in healthy condition.

The Lower Landscape Works involve upgrading or refurbishment of three existing regulators, and construction of one new regulator, which (subject to budget and approvals) is expected to be completed by December 2010.

The Hipwells Road diversion channel option includes extending and enlarging an existing irrigation channel to deliver water from Gunbower Creek to the forest (the Hipwells Road channel), constructing a weir across Gunbower Creek downstream of the channel, constructing a fishway on the National Channel offtake regulator, minor creek works and levee upgrades as required. The project (subject to budget and approvals) is expected to be completed by August 2011.

The works project has been developed to meet the environmental water requirements of the forest ecosystem and will enable the ecological objectives set for the Living Murray Icon site to be achieved. The project design is still in development and may change. The proponent, G-MW, is responsible for obtaining any approvals which may be required under the *EPBC Act*. NVIRP is liaising with the G-MW and the NCCMA to ensure that NVIRP modernisation works in the vicinity are compatible and complementary.

1.2.8 Current status of the action

1.2.8.1 Extent of NVIRP modernised operation

The action under assessment is the modified operation of the fully modernised GMID. Modernisation has been occurring progressively. Full modernisation still requires an extensive roll-out and is not due for completion before 2017. As any part of the system becomes modernised, it cannot be operated in pre-modernised mode. Suspending operation of the modernised elements is likewise impossible because irrigators must be able to receive water deliveries. Therefore, operation of any modernised elements must commence at the start of the next irrigation season or, for meters, as soon as they are implemented.

Table 1-1 provides an overview of the modernisation completed as at 31 December 2009.

Table 1-1: Modernisation as at 31 December 2009

Modernisation component	Units	Modernisation to date	Indicative Modernisation proposed	Indicative Total
Backbone Automation	Number of gates	2,015	1,115	3,130
Backbone Remediation	Length (km)	20	420	440
Metering	No. of meters	1,270	7,350	8,620
Stock and Domestic Metering	No. of meters	0	2,860	2,860
Rationalisation of Spur Channels	Length (km)	15	2,875	2,890

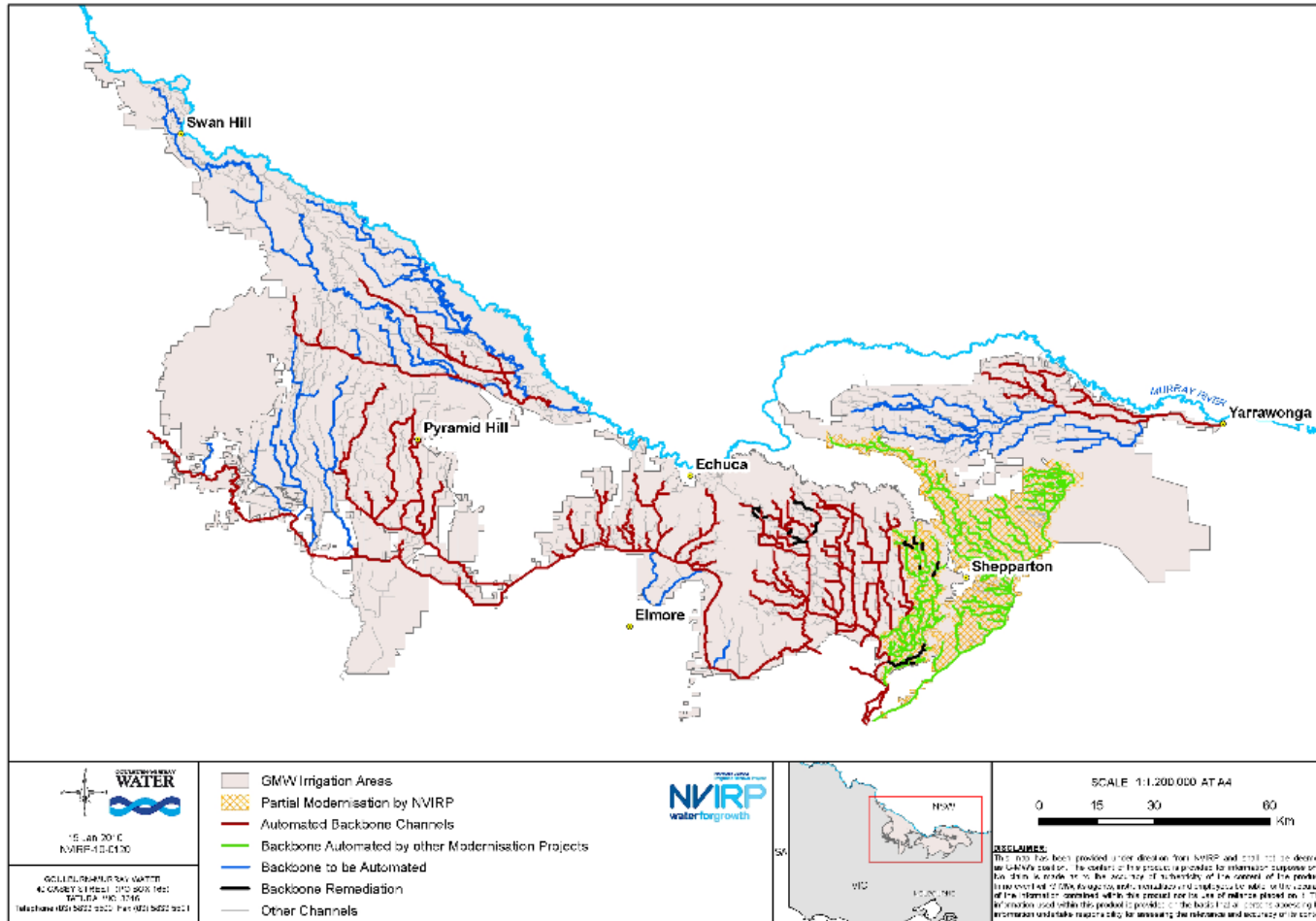


Figure 1-3: Map showing extent of modernisation by NVIRP as at 31 December 2009

Figure 1-3 shows the extent of modernisation by NVIRP as at 31 December 2009. Note that the figure also shows areas where the majority of modernisation has been undertaken by previous projects other than NVIRP in the Central-Goulburn 1-4 and Shepparton Irrigation Areas. In these areas NVIRP will undertake partial modernisation to complete channel remediation and connections.

To date, such operation as a result of NVIRP, has not reached a scale where it could have other than localised impacts. These localised impacts have been managed through the Water Change Management Framework described later in this chapter.

1.2.8.2 Water Change Management Framework

The Water Change Management Framework (**WCMF**) is a requirement of the Victorian Minister for Planning's decision (see Appendix 3) that an Environment Effects Statement (**EES**) was not required for the NVIRP project, as described in the referral accepted on 20 February 2009.

Its purpose is to describe the means by which NVIRP will protect high value aquatic and riparian ecological values (including MNES) through management of water allocations and flows that may be impacted by implementation of NVIRP within the modernised GMID.

The Framework is discussed in detail in Chapter 7 and provided in Appendix 4.

1.2.8.3 Shortlisting process

Consistent with the WCMF, a short-listing process has occurred to determine which wetlands and waterways may be at risk of localised hydrological impacts. Ten wetlands have been identified for Environmental Watering Plans (**EWP**), together with four waterways, with further consideration to be given to Nine Mile Creek.

A full description of this process and its outcomes is provided in Chapters 5 and 7.

1.2.8.4 Environmental Watering Plans

Under the WCMF, the EWP for any site that requires one must be approved before the operation of any modernised infrastructure which affects the supply of water to that site. To date, one EWP (in the Kerang Lakes area) has been approved by the Victorian Minister for Water on 14 August 2009 following review and advice by the Expert Review Panel (**ERP**). The ERP, discussed in more detail in Chapter 8, was endorsed by the Victorian Minister for Environment and Climate Change pursuant to condition 2 of the determination dated 20 April 2009 by the Victorian Minister for Planning that NVIRP does not require assessment by way of an Environment Effects Statement under the *Environment Effects Act 1978* (Vic) (**the Victorian EES determination**).

Further detail of the Victorian EES determination is provided in Chapter 8. A full copy can be found at Appendix 3.

Further detail on the development and content of EWPs is provided in Chapter 7. A copy of the Johnson Swamp EWP is provided at Appendix 5. Four interim EWPs have also been prepared, as discussed in Chapter 7.

1.2.8.5 Relationship between EWPs, NVIRP water savings and the environmental water entitlements

Water savings are savings that result from the modernisation works *after* mitigating for the potential impacts on sites with high environmental values. Water savings are calculated in accordance with the *Water Savings Protocol* (DSE 2009b) issued by the Victorian Government for calculating, applying and allocating water savings generated from irrigation modernisation projects and are described in more detail in Chapter 3. A copy of the protocol can be found at Appendix 6. One of the key principles in the protocol is that water savings are the total (gross) volumes saved less the volume of water required to ensure no net impacts due to the project on high environmental values. Thus, they are savings *after* mitigation of potential impacts on high value sites. EWPs are the means by which the amount of mitigation water required is determined and then managed. Mitigation water required by EWPs will be provided by NVIRP as an environmental obligation on the authority.

After deduction of mitigation water, up to 175 GL of the estimated NVIRP water savings of up to 425 GL will be returned to the environment as callable, tradable environmental entitlements. These will be held by the Victorian Minister for the Environment and the Commonwealth Environmental Water Holder (**CEWH**).

Consistent with the Council of Australian Governments Communiqué (1994) and the NWI, the *Water Act* 1989 (Vic) recognises the need for water for the environment through the creation of the “Environmental Water Reserve”. This is made up of water set aside for the environment as an environmental water entitlement (for example, the Bulk Entitlement (River Murray – Snowy Environmental Reserve, held by the Victorian Minister for Environment and Climate Change), through the operation of conditions on other bulk entitlements (i.e. minimum passing flow requirements), through the operation of management plans under the *Water Act* 1989 (Vic) or through the operation of any other provision of the *Water Act* 1989 (Vic) and regulations or of the *Murray-Darling Basin Act* 1993 (Cth) or *Groundwater (Border Agreement Act)* 1985 (Vic). The *Water Act* 1989 (Vic) sets out the environmental water reserve objective as being “to preserve the environmental values and health of water ecosystems, including their biodiversity, ecological functioning and quality of water and the other uses that depend on environmental condition”.

Environmental entitlements are created under section 48B of the *Water Act 1989* (Vic) and are held by the Minister for Environment¹. They authorise the Minister for Environment, as the holder of the entitlement, to apply any water allocation under that entitlement for the purposes of maintaining the environmental water reserve in accordance with the environmental water reserve objectives, or for the purposes of improving the environmental values and health of water ecosystems.

As a consequence of NVIRP, up to 75 GL (long term annual average) of savings will be converted to Victorian environmental entitlements held as part of the Victorian Environmental Water Reserve and up to 100 GL (long term annual average) of savings will be held by the CEWH. This will be in addition to existing Victorian Government water recovery commitments to the Living Murray and Snowy River initiatives.

Water allocated against these environmental entitlements will be used to achieve the greatest environmental benefit according to a set of established criteria. In Victoria, this environmental water will be allocated taking into account:

- seasonal conditions
- environmental water requirements
- the extent and significance of predicted ecological outcomes
- opportunities to utilise other water sources
- opportunities for multiple downstream use and feasibility and costs of delivery.

The CEWH is currently developing its long term framework for prioritising environmental watering. Discussions occur between the Victorian Office of Water and the CEWH to ensure that the use of Commonwealth and Victorian environmental water is optimised to provide greatest environmental benefit. The actions and policies of the Victorian Government's *Northern Region Sustainable Water Strategy* (DSE 2009a) will also influence this outcome. The Strategy outlines guidance on water recovery targets for river reaches and wetlands in the northern region of Victoria.

1.2.9 Consequences of not proceeding with the action

The consequences of not proceeding with the action would be that further modernisation would cease and the economies, efficiencies and environmental benefits of the fully modernised system would be forfeited. Specifically:

- The opportunities afforded by modern technology to achieve greater and more efficient control of irrigation water would be lost. Only a small fraction of the system (i.e. that part which is already modernised) would receive these benefits, resulting in two classes of irrigators.

¹ It should be noted that the Northern Region Sustainable Water Strategy also recommends the establishment of a Victorian Environmental Water Holder. Once this Office has been established under the *Water Act 1989* (Vic) it will hold and manage the Victorian environmental entitlements and will report to the Minister for Environment.

- The level of service to irrigators would not increase and would decline over time as the antiquated system ages further.
- Higher costs would be incurred in maintaining the full spur-channel system and in meeting the new metering standards. These costs would lead to a higher increase in water charges. The commercial viability of the spur channels would decrease as the fixed costs would need to be recovered from a smaller customer base.
- Efficiency would progressively decrease resulting in increased water losses as the system ages and/or investment is misdirected into superseded technologies.
- Water savings could not be realised, with the effect that water that is currently 'lost' would continue to be lost, rather than captured as usable entitlements. These water losses would also represent a growing percentage of water delivered.
- The manually operated system would deliver levels of service that are inadequate to service the new irrigation technologies needed to drive productivity gains.
- The productivity of the Food Bowl would be imperilled and the productive base would erode as investment and growth either move elsewhere or are directed to dryland farming.
- The social benefits of the project to the GMID community would not be realised.
- The benefits of increased water and food security would not be realised.
- The value of the Victorian Government's investment in the Sugarloaf Water Pipeline would be compromised, requiring alternative water to be sourced from other consumptive users in northern Victoria and New South Wales.
- Up to 175 GL in projected water savings earmarked for environmental entitlements would no longer be available for targeted environmental watering and rivers and wetlands in northern Victoria would remain stressed and highly vulnerable under climate change. Although some incidental water would still reach wetlands and waterways, the opportunities to optimise the use of environmental water, in the context of drought and climate change, would be lost.
- Commitments under the NWI to address over-allocation would not be met.
- Policies and strategies which rely on this action as a component of planning for water security would require revision.
- A reduced environmental footprint of the irrigation district would not be delivered and environmental degradation due to the increased groundwater accessions and drainage outfalls would continue.

- Opportunities to protect and, in some cases restore, environmental values of high conservation status environmental assets would be lost.
- The ability to adapt to, and mitigate to the extent possible, the impacts of climate change in northern Victoria would be compromised.

1.3 Conclusion

The action is a key component of the Victorian Government's water action plan and seeks to achieve enhanced outcomes for irrigators, the environment, urban water consumers and the public at large through more efficient and effective management of the delivery of irrigation water in a context where aged irrigation infrastructure and associated out-of-date operating practices are wasting a precious resource.