

Northern Victoria Irrigation Renewal Project
Environmental Watering Plans



Advice from the
NVIRP Expert Review Panel
to the
Minister for Water

31st May 2010

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1. INTRODUCTION

1.1 This Advice

This advice relates to three waterway and eight wetland Environmental Watering Plans (EWPs).

1.2 Context for Advice from the Expert Review Panel

Condition 5 of the Minister for Planning's decision that an Environmental Effects Statement is not required for the Northern Victoria Irrigation Renewal Project (NVIRP) stipulates that EWPs must be developed for 'at risk' waterways and wetlands before operation of the relevant NVIRP modernisation works commences. The EWPs set out the ongoing management and mitigation of the effects due to the implementation of the NVIRP.

In order to identify 'at risk' waterways and wetlands, a waterway short-listing report¹ and wetland short-listing report² were developed. These reports were approved by the Secretary DSE (then Peter Harris) on 13 August 2009 following advice from the Expert Review Panel (ERP). The outcome was a short-list of four waterways and a short-list of ten wetlands that warranted the development of individual EWPs and one waterway that required further investigation to determine the need for an EWP.

On 11 August 2009 the ERP provided advice to the Minister for Water on four interim EWPs, Lake Elizabeth, Lake Murphy, Campaspe River and Loddon River, and one wetland EWP, Johnson Swamp, on the respective short-lists, which may have been impacted by the operation of the 2009 NVIRP works program. Following advice from the ERP, the Minister for Water approved the Johnson Swamp EWP on 18 August 2009. The Minister also approved the interim EWPs pending preparation of EWPs. Every waterway and wetland for which an interim EWP was prepared in 2009 has now had an EWP prepared, along with others which may be impacted by the operation of NVIRP modernisation works in the 2010-2011 irrigation season.

A review of the requirement for an EWP for Nine Mile Creek (immediately downstream of Serpentine Creek Outfall) and Little Lake Meran, both of which are currently on the short-list, concluded that they would not be at risk such as to warrant an EWP. The ERP has provided advice to the Secretary of DSE on this matter and recommended that Nine Mile Creek (immediately downstream of Serpentine Creek Outfall) and Little Lake Meran be removed from the relevant short-lists. The ERP has also noted that Twelve Mile Creek has been included in the Loddon River EWP and has therefore suggested that it also be removed from the waterway short-list.

This advice relates to the three waterways and eight wetlands on the short-list for which EWPs were prepared this year.

The Water Change Management Framework provides guidance on the preparation of EWPs. Since August 2009 there have been several amendments to the Water Change Management Framework and the amended version is henceforth referred to as the WCMF Version 2. This advice has been formulated taking into consideration the improved guidance for EWP development in the WCMF Version 2.

¹ Feehan Consulting (2009) *Northern Victoria Irrigation Renewal Project Waterway Short-listing Report – Final Report*, 11th August, Victoria

² HydroEnvironmental (2008) *Northern Victoria Irrigation Renewal Project Wetland Short-listing Report*, 7th August, Victoria.

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The North Central Catchment Management Authority (NCCMA) and the Goulburn Broken Catchment Management Authority (GBCMA) were engaged by NVIRP to develop EWPs for short-listed waterways and wetlands. Each EWP was reviewed (in draft form) by the Technical Advisory Committee (TAC) prior to the preparation of this advice.

This advice is based on the final versions of each EWP.

1.3 Criteria Used by the Expert Review Panel

In Section 2 the ERP has structured its general advice on waterway and wetland EWPs around three criteria:

- (i) adherence to the provisions of the WCMF Version 2,
- (ii) adequacy of the technical assessment in relation to:
 - a. environmental values, objectives and goals
 - b. hydrology and the requirement for interim mitigation water,
- (iii) soundness and reliability of the conclusions.

Specific advice relevant to each waterway and wetland EWP is presented in Section 3.

2. ADVICE ON THE ADEQUACY OF EWP DEVELOPMENT

2.1 Adherence to the WCMF Provisions

In the advice on the Water Change Management Framework provided to the Minister for Water on 11th August 2009 the ERP identified a number of areas in which the Water Change Management Framework could be improved. Amendments to the framework have since been developed including further guidance on the development of EWPs, the inclusion of a procedure for localised groundwater impact assessment, and the inclusion of a method to assess the requirement for interim mitigation water.

The ERP is of the view that the improved guidance provided by these amendments has resulted in the development of more robust and complete EWPs. Overall the EWPs have adhered to both the original approved Water Change Management Framework and the WCMF Version 2.

All EWPs have followed the standardised procedural guidance as set out in Attachment E of the WCMF Version 2.

The interim mitigation water assessment method has been applied effectively in all EWPs with the assumptions made to support analysis and the rationale for the judgement as to whether or not interim mitigation water is required being transparently presented.

In EWPs where the procedure for localised groundwater impact assessment was used the ERP has found that it has been applied effectively and is a useful addition to the available range of technical tools.

2.2 Adequacy of the Technical Assessment

2.2.1 Environmental values, objectives and goals

The welcome reduction in time pressure (though schedules have still been very demanding) has resulted in targeted field work to check and refine environmental values and the opportunity to consult regional stakeholders effectively on the basis of sound draft plans. The ERP believes that both factors have contributed significantly to reducing the risk that EWPs will be based on less than a full appreciation of specific local factors or be aimed at inappropriate goals. More manageable time-frames and refined guidance in the WCMF Version 2 have allowed a more logical sequence of activities, particularly in developing wetland EWPs, which, in turn, increases the ERP's confidence that the EWPs incorporate and address appropriate environmental values, objectives and goals. Relevant environmental flow studies have been used where practicable for waterways to provide links between environmental values and components of the flow regime.

2.2.2 Hydrology and the requirement for mitigation water

In contrast to the assessment of environmental values and development of goals and objectives which require the application of substantial professional judgement on a case-by-case basis, the WCMF Version 2 provides explicit guidance on the dependencies of high environmental values on incidental irrigation water and the requirement for mitigation water. Although professional judgement is still required (and has been applied), the process occurs within a clear framework resulting in transparency and thoroughness. The continuing development of the EWP preparation process, and particularly the input of stakeholders and the Technical Advisory Committee (TAC) has led to a more uniform application of professional judgement in the EWPs and the inherent review process provides opportunity to resolve any remaining questions (e.g. at what point does

the relative contribution of interim mitigation water to the total water balance become irrelevant and make its provision unnecessary?).

The equitability and standardisation of the EWP preparation process is enhanced by the use of generalised hydrological models wherever practicable. Thus:

- ▶ Leakage and seepage from the irrigation supply network is estimated from a procedure based on a generalised model and includes a look-up table, and losses from delivery channels are likewise derived from a general formula,
- ▶ Surface water balance for individual wetlands are derived from the Savings at Wetlands from Evapotranspiration daily Time-Series SWET model, and
- ▶ Either a regression-based model or an historical analysis is used to create time-series hydrographs with and without the influence of NVIRP to support waterway EWPs.

The treatment of water quality has been uneven across EWPs. This is reasonable as, in most cases, water quality is not likely to change significantly from the current and, within broad ranges, is unlikely to influence the stated goals and objectives. In cases in which water quality may become a significant driver (e.g. changes to saline groundwater accession, specific requirements for identified key biota) it is dealt with satisfactorily.

2.3 Soundness and Reliability of Conclusions

The water management goal or goals are pivotal in the EWPs as they set the endpoint and so define the preferred water regime, mitigation water commitment, and environmental monitoring. For wetlands, the goals were reached through consultation, consideration of selected high environmental values, and current and up-to-date information on vegetation and habitat condition. Mostly this was a straightforward process leading to a clear-cut decision, but in the few instances where the wetland has undergone substantial drying due to a combination of drought and recent management initiatives targeting efficiency in surface water management, such as Lake Meran, or where there were local societal values, such as Little Lake Boort, the process was more challenging. Despite this, the ERP believes that the goals and therefore the consequent mitigation water commitments and any infrastructure obligations, actual or potential, on NVIRP, are as sound.

The waterways have taken diverging approaches to setting goals, from focusing on the most vulnerable species to using already-established environmental flow recommendations. Despite this divergence, the ERP believes the goals are sound as they can be seen as a point of agreement amongst stakeholders. The assessment of the requirement for mitigation water and where warranted the calculation of the mitigation water commitment follows logically.

The assessment of the requirement for mitigation water is addressed thoroughly in the EWPs and, in those EWPs where the issue is straightforward, a sound decision has been reached. The decision was much more difficult in the case of Lake Meran, and the Lower Broken Creek and Nine Mile Creek, and this is reflected in the presentation and issues raised in these two EWPs.

The ERP considers that the conclusions reached are sound and a reliable platform for moving into the implementation phase. The ERP does however advise that it would be prudent for all management goals and the conclusions reached in the assessment of the requirement for interim mitigation water to be revisited as a matter of routine in the review process.

3. COMMENT AND ADVICE ON WATERWAY EWPs

3.1 Lower Broken Creek and Nine Mile Creek

This waterway illustrates the difficulty and challenges that can arise with respect to assessing the requirement for mitigation water. The multiple objectives for management of creek operations and the associated operating regime along with the multiple channel outfalls affected by NVIRP modernisation works combine to provide a good test of the robustness of the interim mitigation assessment method. The EWP reaches the conclusion that mitigation water is not required, based on the analysis of the dependency of environmental values on irrigation, environmental and natural supply rather than on incidental outfall water and the assumption of a continuation of the established operating regime. The assumptions and rationale for this judgement are transparently presented. There is some uncertainty about the extent to which the modernisation design for the Murray Valley Irrigation Area will be able to improve the operating regime for the creek. The ERP finds the conclusion that there is no requirement for interim mitigation water plausible and advises that a review as provided for within the EWP would be wise once key modernisation design decisions are finalised for the Murray Valley Irrigation Area and in light of operational experience in the intervening period.

3.2 Campaspe River

The assessment of the requirement for mitigation water was sensibly done separately for Reaches 3 and 4 of the Campaspe River. The analyses of the dependence on incidental channel outfalls for Reaches 3 and 4 were based on environmental flow rules, which were used as a guide to environmental values. The assessments concluded that interim mitigation water is not required for either reach. The assumptions and rationale for these judgements, which include the observation that some incidental water ends up in associated water bodies not generally connected to the main river channel and which in themselves do not exhibit high environmental values, are transparently presented.

The ERP endorses the reasoned judgement that baseline incidental outfall water was unlikely to have contributed to high environmental value in Reaches 3 and 4 of the Campaspe River and therefore that interim mitigation water is not required.

3.3 Loddon River

The assessment of the requirement for mitigation water was sensibly done separately for Reaches 4 and 5 of the Loddon River and for Twelve Mile Creek. The assessments concluded that interim mitigation water is required for both Reaches 4 and 5 of the Loddon River but not for the Twelve Mile Creek. The analyses of the dependence on incidental channel outfalls for Reaches 4 and 5 were based on the environmental values recognised in a recent environmental flows study, and hence are representative of current ecological thinking. The calculation of the mitigation water commitment for each of the channel outfalls relating to both Reaches 4 and 5 has been based, where relevant on the net baseline year incidental outfall at the waterway. This is appropriate because of the intention to supply mitigation and other environmental water in the future from Loddon Weir for Reach 4 and from Kerang Weir for Reach 5, so as to avoid any transmission losses. It is also noted that, for Reach 5 of the Loddon River, the intended source of mitigation water is to be from Loddon Weir in accordance with the provisions of the Kerang Weir Fishway Memorandum of Understanding, although the mitigation water commitments have been calculated for each channel outfall and could be used if it became necessary to source mitigation water from an alternative source, such as from the NVIRP water savings.

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The ERP endorses the conclusions in relation to the requirements for interim mitigation water, for the sourcing of this supply requirement in accordance with the provisions of the Kerang Weir Fishway Memorandum of Understanding for Reach 5, and the proposals to efficiently supply mitigation and other environmental supplies in future to Reaches 4 and 5 of the Loddon River over Loddon Weir and Kerang Weir respectively.

4. COMMENT AND ADVICE ON WETLAND EWPs

4.1 Lake Elizabeth

Because environmental values are clearly articulated and the environmental goals are well established, the desired ecosystem (plant community) is clearly defined. This is one of three EWPs for wetlands in the program to date that expresses a clear intention to support bird breeding in the region.

The requirement for mitigation water is made strongly and clearly and the mitigation water commitment is calculated in line with the method in Attachment G of the WCMF Version 2.

The ERP believes that the requirement for mitigation water is warranted and endorses the EWP. The EWP notes that the current delivery capacity is assessed as adequate for mitigation water but less than is desirable for the desired water regime to avoid prolonged filling. The ERP also understands that any enhancement of the capacity is not the responsibility of NVIRP and will be resolved in accordance with policy and process associated with the Environmental Infrastructure Register.

4.2 Lake Leaghur

Lake Leaghur is recognised as an intermittent wetland in which a 3-year wetting/drying cycle is proposed to support both waterbird breeding and a healthy redgum-based vegetation community. These goals and the means of achieving them are clearly articulated.

The requirement for mitigation water is clearly laid out and the calculation of the mitigation water commitment is in line with the method in Attachment G of the WCMF Version 2. The EWP indicates that the current supply infrastructure is adequate.

The ERP supports the requirement for mitigation water and endorses the EWP.

4.3 Lake Meran

Lake Meran is one of the few instances in which setting a goal is particularly challenging, on account of the difference between its status and value as a deep freshwater marsh that has been permanently inundated and its current status, which is completely dry since 2004. The environmental values identified for Lake Meran are primarily those associated with being a deep freshwater marsh, and the goal, worked through a stakeholder process, seeks to maintain those values into the future. The goal is in two parts, which are linked. One is for the current dry phase, deemed 'interim' and seeks to maintain recovery potential for when Lake Meran returns to being inundated by Loddon floodwaters. The other is for the wet phase, with the wetland as a deep freshwater lake that is inundated for (at least) nine out of every ten years. This is an optimistic goal, dependent on floodwaters from the Loddon River. For the interim phase, the EWP proposes a watering program aimed at sustaining relict communities based on an emergent plant complex near the outfall and associated with the delivery channel. It is intended that these communities will be available to 'seed' a lake community when Lake Meran is inundated in the future. Interim mitigation water is essential for maintaining this refuge habitat.

The requirement for mitigation water is assessed in line with the method in Attachment G of the WCMF Version 2. The requirement for interim mitigation water applies to only one phase in a relatively long cycle. Mitigation water is not relevant to the other phase, as a deep freshwater lake. The current supply infrastructure is assessed as adequate.

The Lake Meran EWP demonstrates that the Water Change Management Framework is capable of guiding the successful development of an EWP under quite unusual circumstances. The officers of the NCCMA are commended for their work and for developing the refuge maintenance approach.

The ERP is of the view that this EWP highlights the sense of an inherent review process and advises that regular reviews, particularly in the event that the current dry conditions extend for the next 3-5 years, should re-assess the wetland water management goal and the interim mitigation water requirement with a view to deciding if:

- ▶ The ecosystem in the body of the Lake Meran has progressed too far towards a terrestrial system to respond as currently expected to future inundation, and
- ▶ The retention of a small relict wetland system at the site represents a reasonable investment of environmental water.

4.4 Lake Murphy

The environmental values for Lake Murphy include, importantly, its capacity to support waterbird breeding.

Lake Murphy represents a case that is so far unique, due to the diversity of hydrological connections potentially affected by NVIRP. There is seepage/leakage from neighbouring channels (estimated to be in the range of 7 to 27 ML/Yr using the procedure for localised groundwater impact assessment). In line with other EWPs this is not included in the assessment of the requirement for mitigation water pending future modernisation decisions. In the base-line year, incidental irrigation water recorded at the outfall regulating structure was zero. However leakage through or around the outfall structure is assessed as supporting important environmental outcomes and hence the requirement for mitigation water is found to be warranted for this hydrologic connection. The assessment of the requirement for mitigation water has not however been finalised. The EWP recognises that this unique hydrologic connection will not be impacted unless rationalisation or upgrade of the outfall structure occurs and that if NVIRP actions are likely to have such an impact that leakage will need to be quantified and the mitigation water commitment calculated.

The ERP endorses the conclusions in the EWP and advises that the delay in calculating the appropriate mitigation water commitment be kept under close scrutiny and that timely action be taken to avoid the risk of complications arising.

4.5 Lake Yando

Lake Yando is a mature redgum swamp, supporting a diverse flora and fauna. A water regime involving filling for approximately five months in three years is recommended to support this ecosystem

The assessment of the requirement for mitigation water found that no incidental irrigation water reached the wetland in the base-line year, therefore, in line with the method in Attachment G of the WCMF Version 2 the requirement for mitigation water is assessed as zero. The current supply infrastructure is assessed as adequate to deliver the desired water regime.

The ERP endorses the conclusions of the Lake Yando EWP.

4.6 Little Lake Boort

In addition to providing habitat for important vegetation and bird, fish and other fauna, Little Lake Boort is a valued recreational and social asset and provides a water supply to sporting facilities. The EWP indicates that a wet/dry regime over six years best supports the wetland's environmental values with a minimum of 12 months in six years being dry. This represents a significant shift from recent conditions and results in a potential clash between environmental values and community expectations for recreation that needs to be resolved if the maximum value from environmental water including any mitigation water is to be assured.

The requirement for mitigation water is assessed and well presented, and the mitigation water commitment is calculated, in line with Attachment G of the WCMF Version 2. The current supply infrastructure is assessed as adequate to deliver the desired water regime.

The ERP endorses the conclusions in the EWP including the recognition that if further negotiations or developments regarding potentially conflicting water requirements for recreation do not allow for or compromise the maintenance of environmental values then the requirement for interim mitigation water may not be justified and should be reviewed as part of the review process.

4.7 McDonald Swamp

The EWP seeks to maintain McDonald Swamp as a shallow freshwater marsh providing habitat for a diverse fauna particularly water birds.

The requirement for mitigation water is assessed and clearly presented, and the mitigation water commitment is calculated, in line with the method in Attachment G in the WCMF Version 2. The current supply infrastructure is assessed as adequate for the desired water regime and it is noted that future channel rationalisation may necessitate alternative supply arrangements.

The ERP endorses the conclusions in the EWP.

4.8 Round Lake

The presence of the EPBC-listed small fish, Murray Hardyhead, dictates the goal for this wetland as one that necessitates permanent inundation and an appropriate salinity range. The desired water regime is designed to achieve this.

The requirement for mitigation water is assessed and clearly presented, and the mitigation water commitment is calculated, in line with the method in Attachment G in the WCMF Version 2. The current supply infrastructure is adequate and no upgrades are recommended as part of NVIRP.

The ERP endorses the conclusions of the EWP. It is noted that the environmental values and goals are heavily centred on the continued presence of Murray Hardyhead in the wetland. The ERP emphasises the importance of clear and overt arrangements being put in place to ensure timely and continuing monitoring of the population, including any advice to NVIRP. The ERP also understands that the prime responsibility for carrying out this monitoring lies with agencies other than NVIRP and that appropriate arrangements are in place to ensure that this happens.

4.9 Other Comment on Wetland EWPs

Four wetlands (Lakes Leaghur, Yando, Meran and Little Lake Boort) are subject to opportunistic diversion arrangements ranging from 4.5 ML/Yr to 1500 ML/Yr. The ERP believes that it is inappropriate to have a situation in which mitigation water delivery would be at risk of being diverted for private use. The ERP recognises that this matter applies more broadly to

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environmental water delivery, is aware that adequate interim arrangements are in place in relation to the four wetlands, and encourages the development of appropriate long-term arrangements.

Two wetlands (Lake Meran, Little Lake Boort) also support significant recreational/social values. These values should be duly recognised. The ERP recommends that every effort should be made to integrate responses to recreational and environmental needs. However, in instances in which these demands are not reconcilable, mitigation water should be supplied only if its environmental efficacy is not jeopardised by recreational requirements. The ERP notes that this is not likely to be a problem at Lake Meran but will need to be reconciled for Little Lake Boort.

5. CONCLUDING ADVICE

Three waterway EWPs and eight wetland EWPs were developed in the first half of 2010. Interim mitigation water is assessed as required for one waterway, the Loddon River, and for seven wetlands, Lake Elizabeth, Lake Leaghur, Lake Meran, Lake Murphy, Little Lake Boort, McDonald Swamp, and Round Lake.

The ERP believes that the assessments of the requirements for interim mitigation water are transparent and well reasoned and that the proposed sourcing of mitigation water and the calculations of the mitigation water commitments as set out in the EWPs are clearly consistent with the intent and detail of the guidance in the WCMF Version 2.

It is the advice of the ERP that all eleven EWPs have been thoroughly prepared consistent with the WCMF Version 2, provide a sound and reliable base for implementation, and warrant being approved.

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