

Watering the things that matter

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Key points

- Many environmental flow assessments have too many objectives that are unlikely to be achieved through the use of environmental water.
- Poorly defined and un-prioritised objectives can hamper effective use of environmental water, contribute to ill directed monitoring and set unrealistic expectations among stakeholders.
- Objectives can be tightened and prioritised by clearly articulating the problem at hand, the extent to which that problem is caused by the current water regime and the extent to which it can be mitigated with environmental water.

Abstract

Environmental flow studies and proposals for environmental water use often have a long shopping list of stated objectives and suggested outcomes. The extent to which environmental water can influence those objectives and outcomes often varies. In some cases, the environmental water can significantly change the outcome, but in other cases the effect will be negligible. I suggest that a lack of focus and prioritisation of objectives has significant program ramifications:

1. It hinders effective decisions about how best to use available environmental water,
2. It hinders the design and implementation of environmental water monitoring programs, and
3. It sets unrealistic expectations about environmental water outcomes in the broader community.

This paper uses general examples to highlight the problem and outlines simple steps that can be taken to focus environmental water studies and environmental water use on things where it can have a meaningful effect.

Keywords

Environmental Water Management, Environmental flow objectives, Prioritisation.

Introduction

Environmental problems in rivers and wetlands are usually caused by a combination of factors that have varying degrees of influence and often interact. I suggest that this concept is not adequately considered in environmental water management.

Many environmental flow studies examine waterways through a narrow hydrological lens that can miss or de-emphasise other factors. Few studies adequately consider the extent to which reported environmental problems are influenced by the current flow regime versus other factors, or the extent to which those problems can be mitigated by the use of environmental water given available entitlements and delivery constraints.

The result of this narrow focus is that environmental flow studies and associated management plans have a long shopping lists of environmental flow objectives, many of which are unlikely to be achieved through the use of environmental water. These studies commonly have a brief section at the end about 'complementary measures' that are needed to help achieve the environmental flow objectives. But these usually come across as an afterthought and still imply that environmental flows are the most important tool in the waterway manager's toolkit.

Why do we have poorly prioritised environmental watering objectives?

The reason we have poorly prioritised environmental watering objectives is partly structural but is also due to a lack of awareness of the ramifications. The structural element is associated with how environmental water programs are managed and funded. Environmental water related programs attract separate funding to other forms of waterway management. In turn management agencies often have separate teams working on environmental water projects and most jurisdictions have policies and procedures that describe how environmental water requirements should be determined. All of these things create silos and partition rivers and their problems into discrete categories. There is a tendency for agencies responsible for securing and managing environmental water entitlements to anticipate or suggest benefits of environmental watering before those benefits have been adequately evaluated. There is also a reluctance to drop objectives from earlier management plans that are not well supported by current evidence.

The Victorian FLOWS method (DEPI, 2012) specifies that environmental flow technical panel members should include specialists in aquatic ecology, fluvial geomorphology, hydraulic modelling and additional specialists depending on catchment specific issues (e.g. a vegetation ecologist, fish ecologist, hydrogeologist). In practice, vegetation ecologists, fish ecologists and other specialists in water quality or macroinvertebrates are included in nearly every Victorian environmental flow study without first considering the extent to which those disciplines are needed. Once engaged on the project, those specialists develop environmental flow objectives related to their specific discipline regardless of need.

The issue can be highlighted by considering environmental flow objectives for in-channel vegetation. Every riverine environmental flow study developed in Victoria over the last 20 years and the VEWHS annual Seasonal Watering Plan (see VEWHS, 2024) that is based on recommendations from those flows studies, includes objectives and specific flow recommendations for in-channel vegetation. However, it is difficult to think of a regulated river in Victoria that has a problem with in-channel vegetation that is primarily caused by a lack of flow.

During the Millennium Drought some of Victoria's rivers stopped flowing and became choked with vegetation. That result demonstrates that rivers do need a minimum flow to maintain a clear flow path and diverse habitats. However, this pattern occurred in regulated and unregulated rivers and could not be mitigated with environmental water because catchment storages were dry. In non-drought periods, regulated and unregulated rivers usually have enough flow to maintain a clear flow path in the bottom of the channel.

Under most circumstances regulated rivers have moderate flow and some degree of flow variability, which help to maintain a clear flow path and some variation in vegetation community structure and composition. Vegetation zonation patterns in these rivers may not perfectly match the natural elevations and extent, yet where there is reasonable native vegetation cover there will be some zonation and reasonable ecological function. Significant vegetation problems in most Victorian rivers are more likely caused by uncontrolled livestock, grazing by pest species such as rabbits, proliferation of weeds, altered geomorphology and/or historic land use practice rather than regulated flow regimes. As such they are unlikely to be remedied by the use of environmental water.

There are of course exceptions. The main river in Victoria where flow regulation is the primary cause of vegetation problems is the lower Goulburn River. In that case, unnaturally high flows from late spring to autumn drown bank vegetation and contribute to channel slumping and erosion (see Horne, *et al.*, 2020). However, even in the Goulburn example, the problem is due to too much water rather than not enough water. The latest environmental flow study for the lower Goulburn River includes recommendations to limit those unnaturally high flows (see Horne, *et al.*, 2020).

Various systems have environmental flow objectives for macroinvertebrates, water quality or fish without specifying the current problem with those values or why environmental water is the most

appropriate tool to address the problem. It is not suggested that those objectives are inappropriate in every situation, but without clearly articulating the problem and primary cause of the problem, it is not possible to determine their relative importance. It is also not possible to determine the role that environmental water can play in solving each problem.

Why are poorly prioritised environmental watering objectives a problem?

Having a long shopping list of un-prioritised environmental flow objectives creates the following problems:

- 1. It hinders effective decisions about how best to use available environmental water.**
There is often not enough water to deliver all environmental flow recommendations at the best of times and therefore trade-off decisions need to be made. Having a long list of un-prioritised objectives can make it more difficult to decide how best to use that water, especially if different objectives have potentially incompatible or competing water requirements. A lack of clear prioritisation can also mean that environmental water is used in a particular system for little benefit when a better option may be to transfer or trade that water to another system for greater environmental benefit.
- 2. It hinders the design and implementation of effective environmental water monitoring programs.**
The key starting point for any good monitoring and evaluation program is clearly stated and quantified objectives and expected outcomes. Those outcomes will only be realised if the management action is able to address the most important underlying cause of the problem. Having a long list of un-prioritised objectives means environmental water monitoring programs will potentially monitor a range of indicators that are unlikely to respond to the environmental water management. Monitoring resources are nearly always limited and therefore need to be directed at the things that matter most and are likely to inform a management decision.
- 3. It sets unrealistic expectations about environmental water outcomes.**
There is a large degree of community attention on environmental water programs, with many stakeholders keen to see that the program is delivering the promised outcomes, including providing value for money. This is especially the case in areas where environmental water recovery remains a contested issue. A long un-prioritised list of objectives makes it difficult for organisations to consistently describe the expected effect of proposed and delivered environmental watering actions and runs the risk of community backlash if certain promised outcomes are not realised. Having environmental flow objectives, and stated outcomes, that are primarily influenced by non-flow factors also runs the risk that the environmental water program will be held accountable for adverse issues and outcomes it has no control over.

How can we tighten our focus?

Tightening and prioritising environmental flow objectives and associated environmental flow recommendations can be achieved by following three simple steps.

- 1. Define the problem**
Clearly state what the current situation is and why it is a concern. Where possible the problem definition should describe what type and level of change would be considered meaningful as this will inform the management effort required to achieve the desired outcome and set the benchmark against which any applied management actions will be assessed.
- 2. Identify the potential causes of the problem and score or rank their relative importance.**
This step should consider the main factors that are likely to cause the problem and for the purposes of environmental flow assessments, specify the extent to which the problem is caused by the current hydrological regime.
- 3. Determine the extent to which the problem can be mitigated with environmental water (considering available entitlements and constraints).**
Even in cases where a modified flow regime is the primary cause of a particular problem, a lack

of available supply or physical or policy delivery constraints may mean that it is not possible to achieve a meaningful outcome through managed flow releases.

Once the problem has been clearly defined the outcome of steps 2 and 3 can be plotted on the matrix shown in Figure 1 to help prioritise environmental flow objectives. It is recommended that environmental flow studies and associated management plans focus on those objectives that land in the top right-hand quadrat of this matrix. The matrix is useful for planning, but also for communicating the relative priority of different environmental watering objectives.

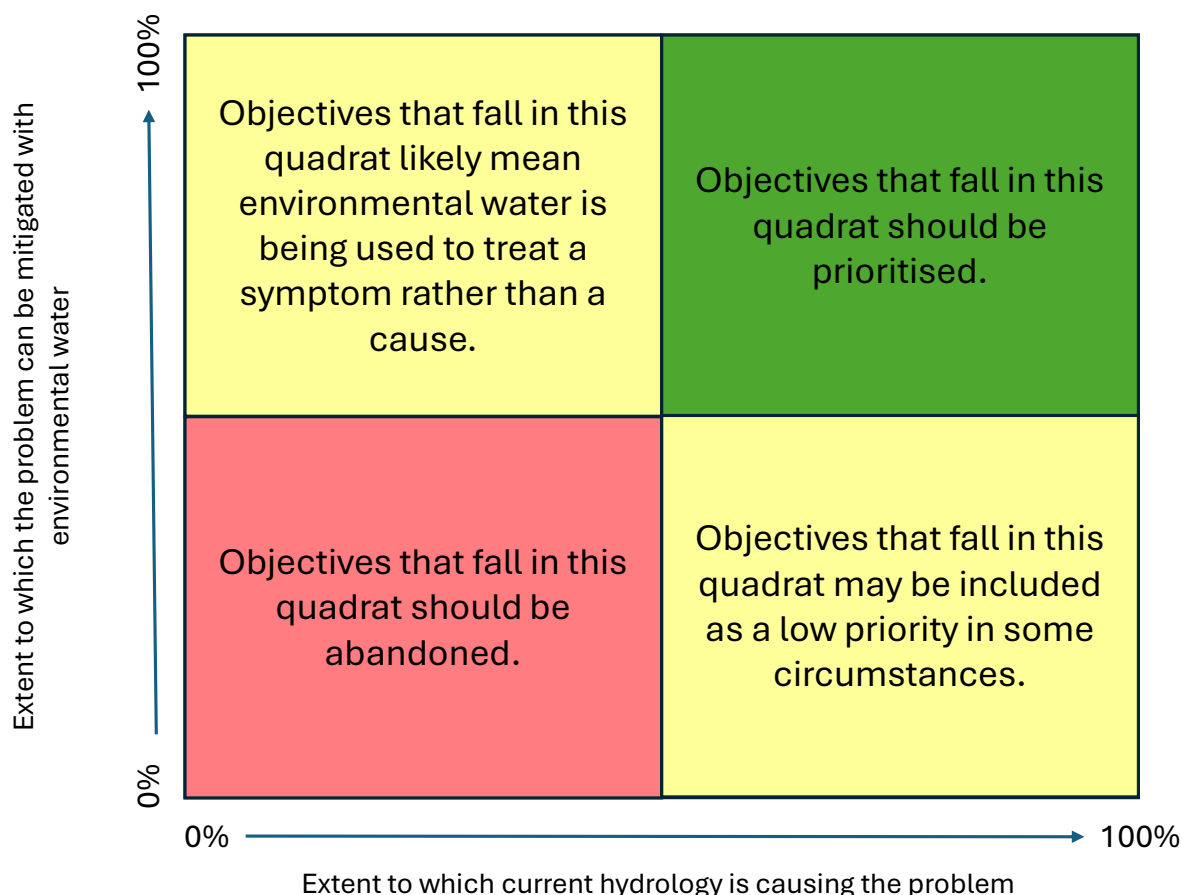


Figure 1 Environmental water objective prioritisation matrix

A version of this matrix was used to prioritise environmental objectives for a project in the lower Barwon Wetlands to support communication between scientists, managers and the community in relation to the likely outcomes of water management at Ramsar listed wetlands. The initial consultation phase of that project identified a long list of environmental objectives. By plotting each objective on the matrix (see Figure 2) we were able focus on specific objectives that were directly influenced by the current hydrology and that could be achieved through the application and subsequent draw-down of environmental water. It is worth noting that in contrast to river channels, vegetation communities within wetlands are significantly affected by altered hydrology and can be managed through appropriate use of environmental water.

The use of the matrix helped us acknowledge the significance of environmental problems associated with run-off from local urban developments and recommend that they needed to be mitigated via other management actions (i.e. not through environmental water management). We were also able to explain why proposed objectives for raptors, reptiles, macroinvertebrates and diadromous fish should not be used to inform environmental watering recommendations. In the Australian Grayling example, we argued that the wetlands do not provide important habitat for any life stage of the species and that

using environmental water to encourage individuals to move into the wetlands is unlikely to benefit populations of this threatened species.

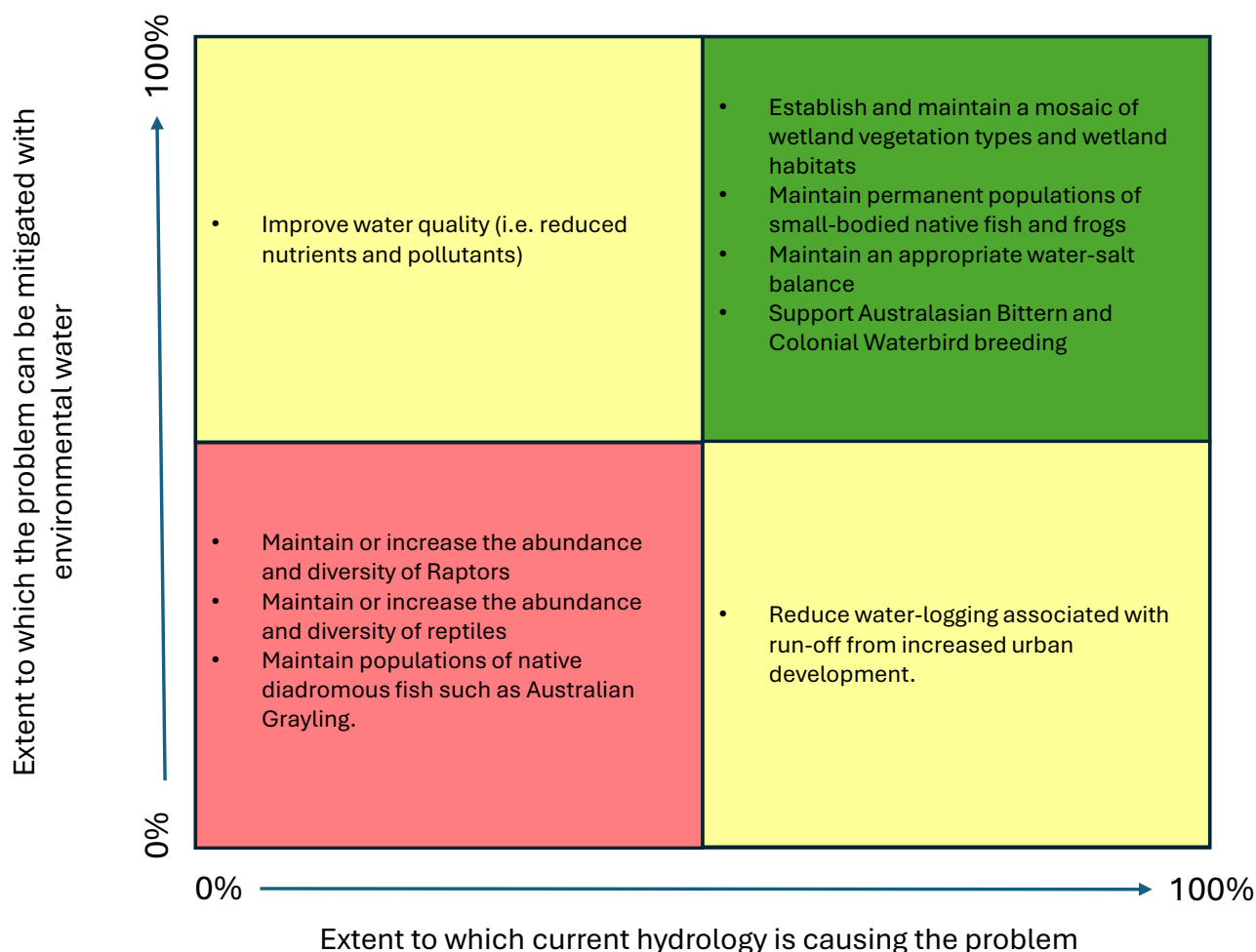


Figure 2 Example application of the environmental water objective prioritisation matrix for the lower Barwon wetlands

The FLOWS method and other frameworks designed to develop environmental flow recommendations do not prevent the prioritisation of environmental watering objectives, but they do not include a specific requirement to do so or specify how it should be done. The suggested steps outlined in this paper are relatively simple and if applied consistently, will help to sharpen the focus of environmental flows studies and associated environmental water plans to ensure we use available resources to water and monitor the things that matter. These steps can be applied to new environmental flow studies and plans, and can also be used to review, prioritise and where appropriate cull objectives in existing plans.

Acknowledgements

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References

- DEPI (2013). FLOWS – a method for determining environmental water requirements in Victoria. Edition 2. Victorian Department of Environment and Primary Industries. 80pp.
- Horne, A., Webb, A., Rumpff, L., Mussehl, M., Fowler, K., and John, A. (2020). Kaiela (Lower Goulburn River) Environmental Flows Study. The University of Melbourne. 203 pp.
- VEWH (2024). Seasonal Watering Plan 2024-25. Victorian Environmental Water Holder.