Sustainable strategy for water

Concerned Waterways Alliance response to the discussion draft of the Central and Gippsland Sustainable Water Strategy: first iteration

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Executive Summary

This document, and the second iteration to follow, provides the Concerned Waterways Alliance's response to the 'discussion draft' of the Central and Gippsland Sustainable Water Strategy (SWS). The 'Alliance' is a semi-formal group of community organisations and non-government organisations that came together in 2021 in order to campaign for strong outcomes from the SWS that meet the mounting crisis of lack of water availability for the environment and water ecosystem health.

This document sets out what we propose should be included in the SWS as a matter of key policy considerations, bearing in mind that it will be implemented over ten years. Our response aims to target actions, programs and framing at a level of detail comparable to that of the 'discussion draft'.

On the basis that discussions over the fate and content of the SWS between the Alliance and government may continue in some form beyond the formal consultation period, we expect some elements of this response will be refined and further developed.

Individual Alliance members will provide separate submissions on the SWS 'discussion draft' as part of the formal consultation process.

Key proposals and responses

A fundamental purpose and focus of the SWS is setting pathways for environmentally sustainable outcomes for water management across the specified region. This intention sits alongside strategic framing of consumptive water management, but environmental outcomes are a key object of the SWS. In that context, clear response to sustainability principles is required. **We propose that express response is articulated in the SWS.**

The implicit strategy of the 'discussion draft' is to identify pathways for diversifying urban water supply. It seeks to resolve foreshadowed problems associated with those consumptive uses, and use those solutions to chart avenues for environmental outcomes. Environmental outcomes under this draft SWS appear as the poor cousin of urban supply and consumptive uses.

This approach is wrong-headed as a matter of strategy and principle. In our view, prioritising and setting firm environmental limits and outcomes is not only consistent with statutory requirements of the SWS but far more likely to drive the water supply outcomes proposed. **We propose the SWS prioritise strong ecosystem health outcomes rather than treat environmental outcomes as contingent on urban water supply solutions.** The Minister should implement that approach by preparing river, wetland and estuary health plans (regional waterway strategies) consistent with the propositions addressing the overarching issues below, prior to and as preconditions for consumptive water planning. The SWS must avoid promising everything to everyone (what we might call the 'magic pudding' approach), and strategically build greater resilience into environmental assets.

Overarching needs relevant to all river basins and water systems

Overarching needs include the following.

- Substantial reform, overhaul and expansion of water information infrastructure (water data and knowledge systems) and its transparency.
- Setting and achieving targets for recovery of water for the environment through a principled approach, by reducing environmental 'deficits' in flow-stressed systems in a systematic fashion reflecting ecological structure and function of waterways.
- Putting all forms of water recovery for the environment on the table.
- Reforming the setting of diversion limits, or 'caps', so that 'take' from water systems can become ecologically sustainable and transparently allocated.
- Establishing a moratorium of any approval of new 'take' for consumptive uses from natural sources (rivers, wetlands, aquifers).
- Broad agreement with the need for a diversification or substitution strategy for urban water supply (and consumptive water generally). In that context we welcome the findings of the SWS (based on the Long-term Water Resources Assessment) acknowledging the current and projected impacts of climate change on water resources and associated environmental vulnerabilities.
- Strengthened binding water quality requirements especially applying to water re-use and recycling.
- Inclusion of economic and pricing reform strategies in the SWS to promote and reflect the diversification approach signalled in the SWS.
- Much more substantial action on urban stormwater reform, across all forms of urban land-use, including through planning and building regulatory improvements.
- Inclusion in the SWS of provisions for demand management targets and goals.
- Potential expansion of desalination capacity.
- Seriously tackling the degrading effects of interception activities, in particular farm dams, through use of the full suite of tools such as water supply protection measures, targeted decommissioning, and education.

Major opportunities for water reallocation

Where major opportunities become available for 'reallocation' of water, notably in Gippsland, as a consequence of restructuring of the power industry, the SWS should direct as follows:

- Convert water allocations presently in effective reserve (¾ bench and Latrobe drought reserve) to forms of legal entitlement ensuring this water is returned to the environment.
- Expressly rule out use of natural (river) sources of water for mine rehabilitation and consider application of

'manufactured' water sources (such as recycled water from Eastern Treatment Plan) to those purposes if water-based solutions are unavoidable.

- In the Latrobe Valley, any allocation of water potentially available for consumptive use, such as agriculture, only to be sourced from decommissioned power stations entitlements, and then only subject to preferred division of allocations in the Latrobe and Macalister systems between consumptive use, Traditional Owners and the environment.

Tambo River. Image: Louise Crisp

Sustainability: the key basis for preparing the SWS

The content of the SWS must identify threats and ways to respond to threats to supply and reliability of water and water quality for environmental and consumptive uses. The SWS must also chart directions for improving the environmental water reserve, for which the focus is the health of freshwater ecosystems.

The SWS is required, in its preparation, to take into account the principles set out in sections 1B to 1L of the (now repealed) *Environment Protection Act 1970*. This requirement is in addition to other mandatory considerations under section 22C(2) of the Water Act. In these respects, while the SWS may be informed by government policy, it is not merely an extension of that policy; it is intended to be responsive to a distinct statutory scheme. Public administration of water management in Victoria must include administration of the law.

Sections 1B to 1L of the EP Act reproduce key principles of ecologically sustainable development and include, additionally, certain principles of environmental democracy. In respect of the former (ESD) the relevant principles are:

- Integrated considerations (decision-making effectively integrating economic, social and environmental considerations)
- The precautionary principle (where risk of serious or irreversible harm and uncertainty, actions should be take proportionately to prevent environmental degradation)
- Intergenerational equity (maintain or enhance environmental benefits for future generations)
- The conservation of biodiversity and maintenance of ecological integrity (these should be 'fundamental considerations' in decision-making)
- Improved valuation, pricing and incentives (internalise environmental costs and benefits in economic actions, conduct and decision-making).

Section 22C(2) requires the *accounting* for these principles in SWS preparation, not merely regard to be had to them. Matters of ecosystem health and ecological sustainability are foundational to the SWS, its design and implementation.

While section 22C requires the SWS to include strategic and policy responses to issues of water supply and consumptive use, the preponderant focus of that section is environmental and ecological. In the alternative, the focus is management of water supply and consumptive uses in a manner that enables and does not compromise protection and improvement of environmental values.

The construction of the draft SWS is not consistent with this approach and it cannot be said genuinely or realistically to take into account sections 1B to 1F (being the sustainability principles set out above).

This proposition is evident, first and foremost, in the fact that priority is anticipated urban water supply shortfalls, refusing to countenance any controls or qualifications of consumptive uses, and framing environmental gains as contingent upon resolving the above supply issues. In the face of climate change risks, those contingent environmental outcomes, even where delivered, are likely to reflect continued deterioration and degradation of water ecosystems. The current premise of the strategy is wrong-headed. Beyond stating that there is simply not enough water to achieve ecosystem health (presumably according to FLOWS methods but the precise basis is not stated), the draft SWS does not appear to be responsive to the ESD principles to be accounted for and especially precaution, intergenerational equity and 'fundamental' consideration of biodiversity conservation and the maintenance of ecological integrity. There is no express assessment of the strategy against these principles.

'Integrated' decision-making arguably requires 'mutual respect and reciprocity' between economic and environmental factors.[1] Priority of urban supply and consumptive uses, combined with contingency of environmental outcomes, appears contrary to 'mutuality' and 'reciprocity' of economic and environmental matters (if we take urban supply and consumptive uses to equate with economic considerations).

Environmental outcomes under this draft SWS appear as the poor cousin of urban supply and consumptive uses. The latter are seemingly non-negotiable. The former are generally negotiable and subject to the vagaries and vulnerability of the deteriorating climatic context, which in turns builds on and compounds existing stressors (such as over-extraction). That, in principle, appears to be the starting point of the document.

In our view, express consideration and responsiveness to these key ESD principles is not only a legal imperative but good policy and practice. Any notions of 'burden-sharing' or 'balance' across 'uses' are not comprehensible without proper accounting and accommodation of ESD principles. They are key guidance to the development of strategy, and ultimately what the SWS is about.

1 See *Telstra v Hornsby SC* (2006) NSWLEC 133, [111]

Key ESD principles in detail

1. Precaution

'Precaution', a legal principle, effectively requires prudence in the treatment of environmental resources. Accounting for precaution in preparation of the SWS requires assessment of the relevant 'serious or irreversible' risks and scientific uncertainties. The risks identified in the SWS (and Long-term Water Resources Assessment (LTWRA)) are patent, if not glaring. Adverse environmental impacts of water resource management resulting from current consumptive uses are well-documented; the compounding threats from climate change are known with a high degree of confidence. They are serious. They are critical. If not managed effectively and promptly they are irreversible (such as collapse of wetlands or extinction of species). Uncertainties are abundant.

All of these propositions are reinforced in the draft SWS and in the LTWRA. A precautionary approach is required. Note that precaution is to be guided by the prevention of environmental degradation2 and avoidance of serious or irreversible environmental damage.[3] Precaution requires a response proportionate to the environmental risk. Precaution is linked with risk mitigation measures such as provision of 'buffers', 'margins for error' and resilience (capacity to factor in or absorb harms).[4]

Strategically, in our view, the SWS is required to prioritise far greater protections of water ecosystems, including through legal and regulatory means, and thereby act to mitigate and as far as possible reverse existing and intensifying vulnerabilities to water ecosystems of consumptive 'take' and climate change combined. The degree of precaution required, as reflected in specific actions and pathways, may vary across basins and it is not required to safeguard (or even target) all and every ecosystem or component part. Ultimately, however, those precise courses of action need to be directed to ecological integrity in those ecosystems and be informed by science.

2. Inter-generational equity

Long-term planning underpinning the SWS could contribute substantially to intergenerational equity in water outcomes across southern Victoria. The Water Act expressly intends water to be managed properly for present and future generations.[5] Intergenerational equity includes the obligation to ensure the conservation of benefits, options and access to resources for future generations. That this proposition is made considerably more challenging by climate change does not undermine its importance to sustainability. At a minimum, it requires that we prevent further degradation in water ecosystem health. Where many ecosystems (notably 'working' water systems) are already in deficit we must safeguard their environmental values. Additionally, we must prevent deterioration in those currently relatively healthy.

3. Ecological integrity and biological diversity

The ecological integrity and biological diversity of water ecosystems are fundamental considerations. Among other things, this proposition means that accounting for ecological limits, function, processes and properties in water ecosystems, including rivers and wetlands, is foundational in design of the SWS. This proposition also underpins the operation of other principles, such as precaution. Take for example the assertion that 'there is not enough water for the environment [that is, for ecosystem health in accordance with the FLOWS approach]'. At what point does the absence of sufficient flow regimes (quantitatively and qualitatively) in key – or indeed all – 'working' waterways across southern Victoria reach localised or even system-wide 'tipping points' where basic ecological properties cannot function or cease to exist (ecosystem collapse)? Is the 'fundamental consideration' of biodiversity conservation and ecological integrity to be accounted for in the fate of certain ad hoc 'iconic' species, such as platypus? What of keystone species such as eel? Or keystone structures such as floodplain wetlands? What is the strategic outcome and/or vision for biodiversity and the integrity of water-dependent ecosystems under this SWS? Environmental outcomes as dependencies on resolving supply issues is contrary to the weight to be given to biodiversity conservation and ecological integrity under terms applicable to design of the SWS.

4. Internalisation of environmental costs in economic decision making

Importantly given the economic imperatives in water resources management, sustainability includes key guidance on how economic measures should account for environmental factors. This principle requires the 'internalisation' of environmental costs in economic decisions. Ordinarily, environmental harm and degradation is treated as an 'externality' in economic accounting. In practice, this condition means degradation of water ecosystems as a consequence of 'take' and diversion of water resources is not factored into economic decisions, pricing, or the value of goods and services.

Current economic settings for water focus on cost return on infrastructure and supply (services), quasi-commercial generation of profit for the Crown (dividends), and a notional quasi-price for environmental considerations (environmental levies). The latter are not transparent and provide no essential nexus between protection of water ecosystems and economic cost; it is in effect a general environmental subsidy derived from households. In practice, historic, current and anticipated degradation of the freshwater environment is a substantial 'subsidy' to water services and to the Crown.

If 'internalisation' of environmental costs in monetary

2 *Environment Protection Act 1970* (Vic), subs 1C(1

3 *Environment Protection Act 1970* (Vic), subs 1C(2)(a)

4 It has been held that the principle is to be framed in terms of equal treatment and equal rights between generations including the right to 'benefit from the exploitation of resources as well as enjoyment of a clean and healthy environment': *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited* [2013] NSWLEC 48, [492].

5 *Water Act 1989* (Vic), sub 1(d)

terms (traditional cost-benefit calculation) in consumptive use is challenging it is appropriate that multi-criteria assessment and calculation is used.[6] In any case, pricing and valuation decisions should be made, not only on the basis that economic signals underpin and transparently aligned with environmental costs and benefits, but in order to drive sustainable outcomes.

We propose the SWS expressly set out the sustainability principles informing it, how the Strategy responds to ESD principles, and how they guide key outcomes of the Strategy, as required by law.

Water, climate and water-dependent ecosystems: connected and compounding crises

The draft SWS sets out with a reasonable degree of candour the situation facing water resources in southern Victoria:

- for the multitude of water systems that may be termed 'working' systems, where there are substantial diversions for consumptive uses, there is already an environmental 'deficit'. That deficit is calculated at 263GL/yr across the region.
- for all water systems climate change is and will further compound decline in rainfall, runoff and water in landscapes and diversions.
- for systems that may be described as not yet stressed desire for diversions combined with climate influences are placing emerging stressors on those systems.

These propositions might be further refined by nuances identified by relevant sciences.[7] But overall scientific trends are consistent with the above. The situation is dire. The problem cannot be understated.

Consistent with the above legal framing of SWS objectives, the SWS must genuinely set out pathways for health of water ecosystems across the southern Victorian regions. To do otherwise is not only potentially in tension with the law but represents a species of denialism. Alternatively, simply delaying real solutions is effectively equivalent to denial of the problem.

The existing environmental water 'deficit' reflects current and accumulated environmental degradation of those water systems. Climate change is likely to compound that deficit. This is to say, our water ecosystems already confront environmental degradation as a result of diversions and consumptive uses. In the context of a *sustainable response*, real steps must be made to reverse this deficit and the environmental degradation and harms represented by it. The deficit represents serious *risk* to water ecosystems arising from water regulation and diversion. Combined with uncertainties, reflected for example in ecosystem health analysis contained in the LTWRA, the SWS, as a precautionary instrument, must contain effective measures to prevent environmental degradation.

The SWS will need to include serious and ambitious measures to protect water ecosystems, remove or reverse the existing environmental vulnerabilities affected by water management, avoid promising everything to everyone (what we might call the 'magic pudding' approach), and strategically build greater resilience into environmental

6 See eg *Telstra v Hornsby SC* (2006) NSWLEC 133, [176], per Preston CJ:

One solution suggested is to combine economic and non-economic measures by way of multi-criteria analysis. Multi-criteria analysis is a tool for integrating different types of monetary and non-monetary decision criteria. It deals with situations where decisions must be made taking into account multiple objectives, which cannot be reduced to a single dimension. Usually, multi-criteria analysis is clustered into three dimensions: the ecological, the economic and the social. Within each of these dimensions certain criteria are set so that decision-makers can weigh the importance of one element in association with other elements. Monetary values and cost-benefit analysis measures can be incorporated as one of the criteria to be considered, and weighted against the other criteria in decision-making

7 For example, general trends of climate-impacted drying can be calibrated with degrees of uncertainty and complexities with the general trends such as greater variabilities in rainfall, tendencies to extreme events (eg floods and droughts) and cascading (eg non-linear) dynamics. Science informing environmental water deficits does not necessarily account for all waterways and is not without methodological limitations. Scientific information on ecosystem health appears to be hampered by lack of data and substantial degrees of uncertainty, as indicated in LTWRA findings in relation to ecosystem health as a consequence of flows.

assets (rivers, wetlands, GDEs), and categorically rule out patently unsustainable actions.

The draft SWS references many yet to be completed strategies and roadmaps, including the Water Supply Readiness Roadmap, Catchment scale Integrated Water Management plans and the Statewide Groundwater Management Strategy. It does not specifically reference the Victorian Waterway Management Strategy (VWMS) which is due for renewal in 2022.

The VWMS is the successor to the Victorian River Health Strategy that covered the period 2002–2012.[8] The latter was the first (and only) Victorian strategy to set out explicit statewide objectives for river health, such as protecting high-value rivers, maintaining ecologically healthy rivers, 'overall improvement' in ecological condition of all rivers and preventing future damage. While the strategy had its shortcomings, it provided an explicit focus on river health and ecological condition rather than the far more utilitarian approach of 'waterway management' that followed it. The VWMS was developed in place of a much more ecologically focused Victorian Strategy for Healthy Rivers, Estuaries and Wetlands following a change of government in 2010.

8 The VRHS has vanished from the public record. The statements given here are from a presentation by Dr Amber Clarks https://www.yumpu.com/en/document/read/5364974/victorian-river-health-strategy

We propose, as a priority outcome, the SWS expressly set out pathways for the return to health of water ecosystems across southern Victoria and a specific roadmap for improvements in the ecological condition of rivers, estuaries and wetlands (overall and on a regional basis).

We submit that this approach to strategic water planning (prioritising water ecosystem health) is not only required by law but the only likely strategic response to drive changes in urban water supply and management, as well as setting any real possibilities of achieving ecologically sustainable outcomes in southern Victoria and addressing the impacts of climate change.

Snowy RIver entrance at Marlo, closed due to low flows, 27 March 2019. Image: Louise Crisp

Strategic pillar: ecosystem health and water recovery targets to drive consumptive water reform, not the other way around

Under the draft SWS, the prevailing strategy for water management across southern Victoria may be described in essence as planning and implementation of diversification of urban supply sources. This appears to be the primary objective of the SWS, on which achievement of most environmental or cultural outcomes are contingent, making environmental outcomes secondary strategic considerations.

We agree with the analysis set out that availability of consumptive water from 'traditional' sources, namely extraction from dams (surface waters, i.e. rivers), supplemented by extraction from aquifers, is beyond its limits. Indeed, as DELWP staff put it, 'there is no more water from rivers'. That could equally be said of aquifers. It is patently clear from the LTWRA and the draft SWS itself that, for so-called 'working rivers' (i.e. those subject to river regulation and/or substantial diversions), most if not all are at or beyond ecologically sustainable limits. As noted above, this fact is perhaps most pithily reflected in the environmental water 'deficit' in those systems.

These conditions raise the essential questions: what should the prevailing strategy be for water management in southern Victoria, in the context of the overarching imperative for sustainability and an acknowledged crisis in water systems (which is tracking and will track the climate crisis) both environmental and consumptive in nature? Is the current strategy of 'urban water supply first' correct or appropriate?

In our view, the draft strategy lacks real drivers or imperatives to shift water management beyond 'business-as-usual', even if delivered in full according to the current proposals.[9] If shifts in consumptive use patterns are required (which the draft accepts they are), establishment of *strict, binding and effective limits* to 'take' from surface and groundwater systems (i.e. natural systems), reflective of improved environmentally sustainable outcomes, create the necessary conditions and drivers of change.

A strategy capable of meeting the analysis presented (climate-induced water crisis) must give effect to strengthened ecological limits. This means, practically, both recovery of water for the environment and greater legal protections for it. Without strict environmental controls (protections) there is insufficient practical incentive to shift from existing water sources (i.e. rivers), which principally affect natural ecosystems. That is to say, regulation needs to drive innovation. Aside from reform of the 'caps' system noted elsewhere, the SWS must deliver greatly expanded use of environmental entitlements (and/or conditions on bulk entitlements) to implement greater legal protection of water ecosystems.

We propose unqualified water recovery targets designed to reduce extractions to a long-term sustainable level to protect rivers and the water resource. They should not be contingent on future water supply options for towns and agriculture. We recommend that key outcomes for the environment should be locked into the SWS first and these used to drive the diversification of water supplies for cities and agriculture, not the other way round. The use of environmental entitlements as protection mechanisms needs to be expanded, as well as strengthened provisions for 'rules based' or 'planned' environmental water.

We propose science-based targets that avoid long-term collapse or serious impairment of all key water ecosystems. Those targets must be precautionary and include consideration and setting of parameters for system resilience. This target-setting must go beyond mere choice of icon species for preservation. It must have a robust basis in ecological science. Indigenous cultural knowledge should inform target-setting as far as practicable. Target-setting must be responsive to key ecological processes such as connectivity in water landscapes.

We further propose that, when diversification of water supplies is considered and the Water Supply Readiness Roadmap developed, key projects such as increased desalination capacity, upgrades to water treatment plants or a recycled/stormwater supply system be declared projects of state significance so they are funded by government or through public-private partnerships not directly by water corporation customers.

9 Acknowledgement of a climate-driven water crisis inherently requires a shift from 'business-as-usual'. 'Business-as-usual' turns on retaining all existing settings of water management, namely that all consumptive diversions and uses can be maintained (even expanded), which already reflect an environmental 'deficit', while certain residual environmental outcomes are sought (according to limited ecological indicators and predicated on maintenance of consumptive settings). That is the environmental 'triage' strategy. 'Triage' is and will be the emerging and prevailing environmental strategy. Three basic problems are evident in this approach:

1. it assumes 'triage' measures are/will be sufficient to avoid decline (even precipitous decline or collapse) of habitat and/or ecological function, which in the face of climate change or otherwise is a highly problematic proposition;
2. in resolving the problem of consumptive (e.g. urban water supply) as a priority there is no real imperative or driver to resolve water-dependent environmental problems (ecosystem health) which are residual (an afterthought) under this approach;
3. giving weight and priority to environmental issues, such as river or ecosystem health, requires weight to be given concurrently to new strategies and approaches to consumptive uses (including urban water supply). This is because to give greater priority to rivers and ecosystem health means water must be kept in those landscapes (indeed, also returned to those landscapes) and consequently alternatives must be found for, and resources and effort directed to, addressing consumptive water needs. In effect, keeping water in rivers and aquifers for their natural function, in the face of historic dependence on these sources, compels other sources of consumptive water to be found.

   Without resolution of environmental foundations to the long-term water crisis there is both no effective driver of the 'diversification' or 'substitution' strategy for consumptive water supply (including urban water) and no imperative to contend seriously or systematically with ecological crisis existing or anticipated in many rivers and water-dependent ecosystems.

Principles of environmental water recovery

The draft SWS sets out water recovery targets with 5- and 10-year timeframes for river basins across the region. We understand these targets to be based on FLOWS studies. The draft SWS does not spell out how the FLOWS recommendations are to be implemented, other than in the negative by proscribing (very unhelpfully) bankfull or overbank flow events. Neither does the draft SWS set out consequences for failing to providing all advised components of a flow (hydrological) regime. It adopts instead an approach of focusing on the requirements of particular species, presumable for their iconic or indicator status, such as Australian grayling, and assuming that hydrological requirements for such species will protect all aquatic species.

This approach is patently flawed, as the flow requirements of different species vary markedly, even within species groups. For example, small-bodied fish generally have shorter life spans than large-bodied fish and may therefore require more frequent cues to trigger spawning. Providing freshes at a frequency suitable for Australian grayling may be too infrequent for small fish such as galaxids or pygmy perch and could potentially lead to local extinction through lack of opportunity to reproduce.

The focus on structure (particularly charismatic species) also risks a lack of attention to ecological processes and function that underlie the survival of species and ecosystem integrity. In an obvious example, floodplain species depend on floods for recruitment and to maintain genetic diversity. But many fish species also depend on the ability to migrate onto the floodplain for successful recruitment. The channel and the floodplain are interdependent in terms of sediment movement, food webs, nutrient cycling, habitat formation, and so on.

The draft SWS seeks to avoid cease-to-flow events (p57) as a minimal priority, again without spelling out how meeting this particular component of the flow regime benefits rivers in absence of other flow components. Longitudinal connectivity is obviously desirable but of itself is a strategy of triage likely to contribute to collapse of key features of ecological function and thereby imperil water ecosystems already degraded.

The impacts of continued low flows will be very apparent in our highly valued estuaries. In permanently open estuaries such as those in the Gippsland Lakes, persistent low flows are causing the salt wedge to travel further and further upstream with major impacts on fringing freshwater wetlands and important recreational fishing species such as bream. These factors are likely to compromise the ecological character of the Ramsar site. Low flows are likely to cause intermittently open estuaries such as the Anglesea River to close for longer periods. This leads to a different set of problems such as flooding due to water back up, water quality issues including stratification, and a lack of migration opportunities for fish.

Aspirational 50-year targets for the 'long-term protection of priority environmental values' are set in each regional chapter (for example on p214 for Gippsland). We believe this long-term protection should be the aim of the strategy and what is legally required by the Water Act. These targets are critical to rivers continuing to be rivers.

The 50-year targets are presumably based on the environmental water deficits identified earlier in the discussion draft (p55), although this is not made explicit in the text. Another major omission is the absence of any discussion of the consequence for rivers of not meeting these targets sooner. Can rivers survive with any semblance of natural ecological function intact for another 50 years without enough water to protect 'priority environmental values? We submit that is highly unlikely.

The Alliance has conducted a brief analysis of the proportion of the 50-year target that will be delivered for each river in the 5- and 10-year timeframes of the draft strategy.

RIVER	5-YEAR TARGET (ML)	10-YEAR TARGET (INCLUDES 5 YEAR TARGET) (ML)	50-YEAR TARGET (ML)
Latrobe	1,500	4,400	89,000
Thomson	8,000	15,000	31,000
Macalister	6,000	12,600	29,000
Yarra	-	11,000	34,000
Maribyrnong	3,000	7,000	-
Werribee	9,607	11,885	12,000
Moorabool	2,640 + 700	6,500	17,130
Barwon	2,336	5,000	46,959

The inference of this target-setting approach is that the higher the 50-year target the lower the proportion that will be delivered in 5 and 10 years. Only rivers such as the Maribyrnong and Werribee with relatively low 50-year targets have any chance of seeing them met in full. Other rivers are all left waiting, with hardly a dent in the target for the Barwon and Latrobe.

Another problem with the draft SWS is that, *even where all contingencies in the strategy are met*, there is insufficient water to meet the water recovery targets. Close examination of the substitution strategy outlined in Figure 6.1 (p121) reveals that 44 GL will be available to be returned to rivers by 2040 and 123 GL by 2065. The water recovery targets for the Yarra, Thomson, Maribyrnong and Werribee are all reliant on new supplies coming on line for Greater Melbourne. The combined 10-year target is 45 GL, due in 2032, well before all the actions envisaged to manufacture more water will be completed. Our rivers simply cannot afford to wait until new urban supplies come on line.

Notional calculation for other basins within the region are even more problematic given that major supply augmentations outside of Melbourne are not under consideration. By 2065 climate change will have eaten away up to 50% of water currently available for rivers, rendering the 123GL projected to come on line in 2065 totally inadequate to meet river needs.

We propose a more transparent and realistic approach to the setting of water recovery targets, guided by water recovery principles. An express framework for water recovery should be incorporated into the SWS and, as a subsequent step, into the *Water Act 1989*.

Water recovery principles should include:

- Target-setting and directions for water recovery (returning or securing water in the landscape to achieve environmental purposes) must account for all key aspects of ecological structure and function of the relevant basin dependent on flow (hydrological) regime. For example, water recovery targets should be based on functions (such as ecological processes, nutrient cycling, food web dynamics, species recruitment) in addition to structure (such as morphology, biota, species composition) and recognise the interplay between channel and floodplain.
- The flow regime and the science informing it (including where based on FLOWS studies) must be informed by an integrated and whole-of-system approach, reflected in a proposed model outcome. The latter may be based on a practical or operational 'vision' for the relevant river system or, preferably, a reference model.[10]
- Noting the intended purposes of the FLOWS method is to assess and account for the state of flow-stressed systems, ensure FLOWS analysis is applied solely to the objective of improvement in waterway and water ecosystem health. Application of the method (analytical tool) should, as relevant, recognize but not be driven by hydrological (flow) scarcity or 'deficit' in the system. To do the latter is invariably to continue decline.
- Water recovery should be governed by an intention to achieve the 'highest and best level of protection and recovery possible'.[11] Target-setting based on this goal-setting approach should be for short- (for example, 5 year), medium- (10 year) and long-term (e.g. 50 year) targets.
- The long-term protection of priority environmental values, functions and processes should be a starting point for the SWS, not a 50-year aspirational target. Operating as the latter there is little hope of those outcomes ever being achieved.

Overarching issues of water policy and practice

The diversification and substitution strategy for consumptive uses

General response to the principle of diversification of water sources and 'substitution' of alternative water sources for surface and groundwaters

As noted above, we agree in principle with the need to reset urban water supply in southern Victoria. In particular, the draft SWS proposes what is in essence a strategy of diversification of water supply sources and substitution of water from 'traditional' sources, namely dams and rivers (with supplementation from groundwater), by water from so-called 'manufactured' sources and from the urban catchments themselves. No doubt there are challenges in this strategic shift. We talk to some of those challenges below, including proposals for policy conditions, qualifications and/or safeguards attached to the 'diversification' and 'substitution' strategy. Primarily, a greater level of ambition and candour is likely to be required. The technological means and opportunities to identify substitute or diversified water sources are not necessarily new. For example, water treatment, stormwater/rooftop water harvesting and desalination are known technologies. The issue, we submit, is less likely to be technological than one of public and institutional behaviours, expectations, drivers, and regulatory and policy settings. Bundled in with those challenges is the fact that an implicit assumption of the SWS is that water supply can expand indefinitely. The SWS specifically anticipates demand management approaches (i.e constraining consumptive uses) and those provisions need to be taken seriously and reflected prominently and carefully in the SWS.

Economic principles and drivers for ecosystem health and water source diversification

Natural resource management and economic behaviour changes concerning them typically require consideration of economic factors and use of economic measures to affect desired outcomes. Water management is heavily influenced by economic, commercial and quasi-commercial factors, failing to internalise environmental costs as outlined above. In effect, natural water systems have 'subsidised' consumptive water supply for generations. In the face of climate shifts, this approach is no longer tenable.

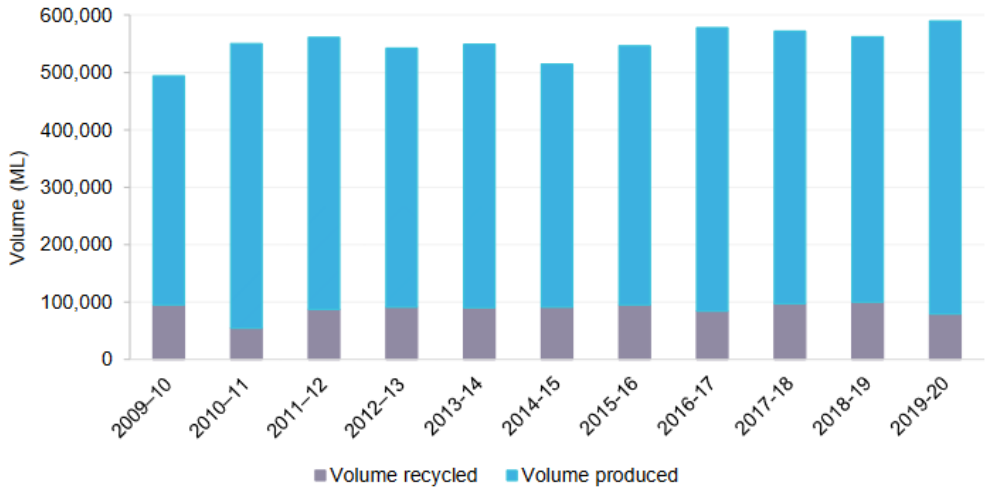
The SWS needs to include policy signals for the economic framing and drivers for change. This may be done at the level of policy principles for present purposes of relatively high level water planning at.

We propose the SWS include a commitment to economic and pricing signals as a means of driving the diversification strategy proposed.

10 See eg SERA *National Standards for the Practice of Ecological Restoration in Australia* (2nd ed, 2018), 4-5, https://seraustralasia.com/standards/National%20Restoration%20Standards%202nd%20Edition.pdf; Gann et al 'International principles and standards for the practice of ecological restoration, 2nd edition' (2019) 27 *Restoration Ecology* 51 s1, s11-s14, https://onlinelibrary.wiley.com/doi/full/10.1111/rec.13035

11 Compare SERA *National Standards for the Practice of Ecological Restoration in Australia* (2nd ed, 2018), 13

RECYCLED WATER VOLUME AND PERCENTAGE, 2009–10 TO 2019–20



Source: Victorian Water Accounts 2019-20[12]

Recycled water use and contamination

The draft SWS admits that uptake of recycled water use has stagnated at well below the '20% by 2020' target set in the Central Region Sustainable Water Strategy. Cost continues to be a disincentive, for example golf courses in Werribee prefer to use higher salinity river water for watering because it is cheaper than recycled water. A major boost is needed if the current strategy is to achieve its objectives for manufactured water and substitution for river water.

A key issue is the presence of nutrients and contaminants in recycled water. EPA guidelines[13] for the categorisation of recycled water as Class A, B or C, deal with pathogens, not with nutrient loads or salinity, nor contaminants such as long-lived chemicals e.g. PFAS, pharmaceuticals and endocrine disruptors. All these unregulated pollutants have a major impact on the beneficial uses of recycled water, including its release into rivers such as the Leigh or the Latrobe.

The draft SWS repeatedly refers to recycled water as 'fit for purpose' without defining what fit for purpose means. The EPA itself is calling for actions to 'enhance the use of recycled water ensuring delivery of suitable water quality for a range of uses:

1. the inclusion of a regulatory framework to encourage and enable the safe use of recycled water;
2. consideration of establishing national standards or guidelines for current and emerging chemicals within recycled water to ensure that it is fit for purpose and does not pose a risk to people or the environment; and
3. consideration of a national strategy and support for improved technologies to reduce or eliminate these chemicals from leaving treatment plants, and at the same time minimise these chemicals getting into wastewater streams'.[14]

We propose the addition of criteria for nutrient load, salinity parameters and contaminant levels to the categorisation of recycled water to create certainty around its suitability for end uses, including release into rivers.

We recommend the criteria for contaminant levels include pharmaceuticals, all bio accumulative chemicals and for life chemicals such as PFAS to prevent chemicals contaminating lands, entering the food chain or impacting on river health.

We recommend an overhaul of Water Corporation's Risk Assessment Framework including Management Plans between Supplier and User noting the new General Environmental Duty obligation under the EPA Act 2017 and disclosures of potential biocumulative environmental contaminants.

Economic settings, including pricing, need to be reformed in order to drive the outcomes on 'manufactured' water proposed in the draft SWS.

In 2019/20, the Eastern Treatment Plant (ETP) discharged more than 150GL of treated water to the ocean. Only 10% of its production was recycled, with two thirds being used on site.[15] The ocean discharge point is at Gunnamatta, more than 60 km from the plant, so pumping costs are already considerable and paid for by customers. The government has been trying for years to find alternative uses for the Class A water produced by the plant but seemingly without success.

We contend that pumping treated water to the ocean is wasted water and that the 150GL available from the ETP could make a big contribution to the manufactured water aspirations of the SWS. It is time for the government to get serious about finding consumptive use for this water and treating it to a standard where potable reuse is an option. Supplying water to the Latrobe valley coal mines to free up water for environmental and Traditional Owner use in Gippsland is another possibility. While these options are expensive, the benefits are great and in a drying climate we

12 https://waterregister.vic.gov.au/images/documents/Victorian-Water-Accounts-2019-2020.pdf

13 https://www.epa.vic.gov.au/about-epa/publications/1910-2

14 'EPA submission to Productivity Commission Inquiry into National Water Reform (2020)

15 Victorian Water Accounts 2019-20, p 39

can no longer afford 'once through' systems that simply discharge excess water to the ocean.

We propose that water from the ETP be treated to new proposedstandards (as above) that open up options for reuse that cannot currently be considered and that ocean outfall cease as soon as possible.

We support proposed direction 11-2 that water from the Western Treatment Plant be further treated to reduce salinity so that it can be used for agriculture in the irrigation areas without being mixed with river water, thus permitting river water to be returned to environmental use.

Integrated water management and urban stream syndrome: driving stormwater/rooftop harvesting as a resource

The draft SWS acknowledges the impact of excess stormwater and flash flooding on urban rivers and creeks, which is the root cause of 'urban stream syndrome'. Both water quality issues and stormwater management indicate the imperative of *regulatory responses across government* (water combined with pollution control and water combined with planning controls) and avoidance of siloed action.

The SWS suggests that an additional 80GL stormwater is available for capture (p143) and that it has in place strategies which will see this stormwater being reused. However there a number of questions about the assumptions made:

- There have been a number of precinct scale harvesting and reuse projects that have led to good outcomes for alternate watering of reserves and parks. However, locations for these types of projects are very hard to find and are invariably expensive in the provision of a levelised water cost. Overall, they will not account for much in the total water supply budgets – but are nonetheless good outcomes. Finding locations for retrofitting storages is hard in existing areas.
- The general matter of using and infiltration stormwater for urban cooling and greening streetscapes is problematic in the majority of the Plenty, Northern and Western Growth corridors. The VPA's subdivision template does not allow sufficient footprint areas for infiltration of runoff from impervious areas which are now up to 80% of the new developed areas. This is compounded by the fact that the parent soils of these areas are sodic and have a low percolation capacity. This limits the ability to infiltrate the large volumes of runoff generated from the new developments. There is no developed toolbox to address these issues, meaning infiltration targets may not be met, nor urban stream syndrome addressed.
- It is virtually impossible to reuse stormwater that is produced off developments in sodic soil country, as the quality is very poor with high turbidity and suspended solids from the activated erosion of the sodic soils. This highly turbid water is not easily settled nor is filterable without the use of chemical flocculants and large settling basins.
- The value of mandating rainwater tanks is readily lost due to the fact that urbanites have little affinity with tanks and often do not maintain them. They also take up valuable footprint area which is hard to find in the very small allotment sizes being produced.
- Schemes where all tanks are owned and operated by the retail water company have merit, but this concept has only been used in a few trial areas.

We support the setting of ambitious targets for storm-water use but this needs to be backed up by genuine and effective means to achieve them, otherwise we are setting up this proposed outcome for failure.

We support proposed direction 7.7 to investigate a city-wide alternative water supply network as this would significantly increase the options for stormwater use.

We propose, supplementary to proposed direction 7.7:

- That the SWS set firm and clear principles for framing city-wide of capture and re-use of rainfall in the urban catchments themselves.
- That framing includes substantial reform of planning and building controls across all urban zones to enable quantitative targets in capture of rainfall in urban catchments through progressive/incremental upgrade of building stock and urban infrastructure over time (say, 20–30 years). That framing will need to account for changing character of rain events as a consequence of climate change effects.
- That urban stormwater reform include resolution of key issues of policy 'delivery' such as:
    - Control and ownership of all storage infrastructure (including tanks and constructed wetlands)
    - Economic incentives (and as appropriate disincentives) to widespread uptake and use of infrastructure.

The SWS anticipates demand management as a component of strategy

We can and should include express, ambitious targets around demand management for water, including in urban water supply, into the SWS. Indeed, the SWS provisions in the Water Act require it. Demand management was an important element of water management in the Millennium Drought and an integral part of the previous Central Region Sustainable Water Strategy. As DELWP staff point out, a new generation of water users has emerged since then and messages about per capita water use and water efficient appliance need constant reinforcement. Target-setting around this tool will be important to outcomes for sustainable water under the climate crisis. We would support the setting of strong per capita daily use targets, such as 130 litres per person per day.

Desalination capacity

The existing capacity of the Wonthaggi desalination plant of up to 150GL/yr will need to be employed early to allow for Barwon Water and Central Highlands Water to decrease their percentage of take from the Barwon and Moorabool River systems in the short term as envisaged in Proposed

Direction 12-1. The early meeting of the water recovery targets in the Moorabool and Barwon are contingent on increased supply and upgrades to the Melbourne to Geelong pipeline.

The Wonthaggi desalination plant has potential for an upgrade to 200GL/year with the addition of increased reverse osmosis units. Given that Melbourne's population growth will continue, it is foreseeable that the second stage expansion of the Wonthaggi Desalination Plant will have to be brought forward in readiness to meet demand by 2030. This is a short lead-time and planning should commence at once to allow for full environmental assessment.

There is a significant question as to whether the Wonthaggi Plant should be the only desalination plant in Victoria.In recent years a case has been made for a second desalination plant, so that an independent supply could be established for West of Melbourne (Melton, Sunbury, Gisborne, Mt Macedon, and Romsey), Greater Geelong and Surf Coast plus also potentially supplying Ballarat. This option would be intended to address the need to diversify supply points and the overall cost of pumping and system efficiency from Wonthaggi around to Geelong and potentially to Ballarat. Additional capacity at Wonthaggi could then be redirected to North of Melbourne and West and South Gippsland as needs be. If proposed, the location for a second desalination plant will need a thorough investigation. It is possible that additional desalination capacity for Greater Melbourne, more than can be supplied from the Wonthaggi Desalination Plant, may also be needed post 2030 to meet the needs of the future growth.

Any such project would need to be a State Project funded via State-raised loans that are serviced by the ratepayers of the Water Agencies it supplies. Power supply for any proposed desalination plant must be 100% renewable.

As desalination will likely be a key to attaining the return of environmental flows to many of our rivers in the west, but also in Gippsland, it is important that clear decisions are made in this SWS not only as to the expansion of the existing desalination capacity but to allow public scrutiny of any proposal for a second desalination plant. Any new plant must be powered by 100% renewable energy, use best practice technology to avoid damage to the marine environment and be subject to a full environmental effects statement.

We propose that consideration of the region's future desalination needs, as suggested in Proposed direction 7-2, start immediately, beginning with a potential expansion of the Wonthaggi desalination plant and consideration of whether a second plant should be proposed to meet Geelong's needs, on condition that future desalination plants are powered by 100% renewable energy, use best practice technology, are subject to full environmental assessment and contribute to restoring river flows and driving environmental improvements.

Caps and unallocated water

The Victorian Water Act does not set out a specific legal or regulatory mechanism for establishing whether water use is ecologically sustainable in the long-term or a restriction on what harm can be done to the ecological health of rivers or groundwater. It differs in this respect from comparable Commonwealth and NSW water legislation, for example. It does not define how caps on extraction should be set, what principles they are based on or any mention of an environmentally sustainable level of take.

However, water legislation in Victoria clearly contemplates the need for environmental or ecological limits on diversion and 'take' of water resources. This is evident in the purposes of the Act[16] and in the concept of the environmental water reserve.

To give effect to limits and 'caps', the Minister for Water has the ability, for example, to declare a Permissible Consumptive Volume (PCV)[17] for an area and a period of time. The Act is silent on what needs to be taken into consideration when a PCV is determined. Such guidance as exists is set through Ministerial rules and guidelines[18], which consider risk management, but do not define an acceptable level of resource or environmental condition, or set out pathways for improvement in condition. The use of Sustainable Diversion Limits (SDLs), particularly to enable so-called 'winterfill' licences, does not have a legal basis (although it informs statutory tools) but is entirely a matter of policy, set through calculation based on estimates of streamflow and current levels of diversion.[19] The method of SDL calculation is based on estimates of flow, frequently extrapolated from gauged catchments to ungauged catchments, an assumption that 30% of average stream flows are adequate to support environmental condition and a limit on the daily rate of extraction.[20]

It is a stretch to say this 'SDL' tool is informed by science. As far as we are aware there is no robust setting of diversion constraints in a manner informed by best available ecological or hydrological sciences. Nor do they appear, in any meaningful way, to be informed by prudence or precaution in response to environmental risk and uncertainty – arguably a cornerstone of sustainability. The obscurity of information and procedure in the use of these 'caps' itself belies a proper scientific basis and, indeed, good practice in public administration of a public resource.

The setting of 'caps' or extractive limits is fundamental to basic concepts used in the SWS and water management, such as whether a water system is 'fully allocated' or whether water resources are 'unallocated'.

16 See *Water Act 1989* (Vic), s 1: 'The Act has the following purposes... (d) to make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future generations... (j) to provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses... (k) to provide for the protection of catchment conditions...'

17 *Water Act 1989* s22A

18 See for example DELWP (2015) *Resource Share Guidance: Planning the take of Victoria's groundwater resource*

19 Minister for Water Policies for managing Take and Use Licences (2014)

20 DELWP (2015) Sustainable Diversion Limits and Licensing. Training Manual v3

Freckled Ducks, listed as Endangered in Victoria, on Lake Guyatt. Image: Roger Bilney

Given these shortcomings in the legal framework, and the fact that we cannot be certain that current caps reflect an environmentally sustainable level of take[21], **we propose** an immediate moratorium on the issue of new licenses for consumptive take across Victoria. Additionally, any so-called 'sleeper' licences should be subject to an immediate constraint on their activation or transfer. No increases to permissible take under any form of licence should be enabled. All catchments should be capped at current levels of extraction. These measures should be incorporated into the SWS as a precondition to inclusion of appropriate sustainability principles into the Water Act and rules for their application, review and development of policy for an environmentally sustainable level of take applicable across all catchments in Victoria.

Concepts such as an 'environmentally sustainable level of take' must conform with protection of important environmental assets, properties and functions at appropriate (region, basin, sub-basin) scale. It must be informed by 'best available science'. FLOWS studies are a starting point for this exercise but tend to be geographically constrained and methodologically limited to certain, flow-stressed rivers. A more comprehensive program of ecosystem health assessment is required. Bringing forward revised ISC reporting and/or significant expansion of FLOWS-type assessments must be a priority. The water-climate science interactions must similarly underpin the information base for a more comprehensive, strategic analysis of water management, leading to reform of the current 'cap' system.

We further propose clear, practical and definitive steps are taken through the SWS to reform the current setting of 'caps' and diversion limits across southern Victoria, in order that they, to the maximum degree practicable, are brought into conformity with the management of water resources for 'sustainable use for present and future generations'. This will mean grappling with policy settings to achieve water management moving toward 'environmentally sustainable levels of take'.

Monitoring, surveillance and water information

'We cannot manage what we do not measure'

The LTWRA did not have appropriate data sets to assess the impact of flow on waterway health[22]. Data on fish and invertebrates was inadequate to form a conclusion and water quality data showed inconsistent trends both within and between catchments, and could not be related to changes in flow. Government response, while acknowledging the need to improve datasets for future LTWRAs, seems to be focusing on VEFMAP data which is collected in catchments with environmental entitlements. It will remain very difficult to assess the impacts of changes in flow regime (if they are measured at all due to lack of gauging stations) in unregulated catchments. In short, a great deal of water resources management in southern Victoria is affected by uncertainty, deficiencies of information or knowledge, and/or unevenness in that knowledge base and its bias to water systems subject to extractive and consumptive uses.

21 See for example VAGO (2010) Sustainable management of Victoria's groundwater resources

22 DELWP (2020) Long Term Water Resource Assessment for Southern Victoria, Part B

The 2018 State of the Environment Report shows some remarkable gaps in the state of our knowledge[23]. It has no data on the condition of groundwater ecosystems, threatened species that are wetland dependent or on floodplain functionality. It identified a decline in the condition of flow regimes across state (all rivers have below long-term average streamflows, but there is no specific information on how different components of flow regime are faring) and a lack of data on threatened freshwater plants and animals. Riparian condition was ranked as both poor and poor data quality, while all frog and fish species are declining, with the exception of some gains for Trout cod and Macquarie perch. The only data available for fish was from VEFMAP monitoring for regulated rivers with an environmental water entitlement.

Recent focus of government investment in monitoring has been on target setting and intervention monitoring, such as VEFMAP. This monitoring is important to measure the effectiveness of interventions such as environmental watering but neglects baseline condition monitoring. The next iteration of the Index of Stream Condition (ISC) is not due to be repeated until 2028, which will be almost 20 years since the previous dataset. While it is not intended as trend monitoring, being described as 'point in time', there is no other baseline condition statewide monitoring program. The recent review of the Victorian Waterway Management Strategy [24] notes the lack of focus on longer term outcomes away from 'flagship' rivers which are mostly regulated systems for which environmental entitlements exist. It also recommends greater focus on floodplain and wetland connectivity.

Groundwater monitoring is just as fragmentary, with the Auditor-General concluding in 2010 that it is impossible to tell if groundwater use is sustainable or not[25]. Since groundwater is a hidden resource, there is much inherent uncertainty around groundwater processes, especially the key aspects of its movement, storage and quality. Hydrogeologists rely on conceptualising groundwater systems (i.e. geometry, water bodies, aquifer interactions, hydraulics, flowpaths, temporal responses and quality) from information such as

23 https://www.ces.vic.gov.au/state-of-reports/state-environment-2018-report

24 https://www.water.vic.gov.au/__data/assets/pdf_file/0025/545425/Independent-Review-of-the-Victorian-Waterway-Management-Strategy.pdf

25 VAGO (2010) Sustainable Management of Victoria's Groundwater Resources

Dying fringing vegetation - Lake Coleman. Image: Elke Nicholson

geology, physiography, soils, land-uses, geophysics, climate, groundwater discharge and groundwater bores. Conceptual models are used to create numerical models with which to run scenarios such as the impacts of pumping, climate change and ecosystem impacts. Data paucity creates considerable uncertainty in both conceptual and numerical models. Therefore good quality spatial and temporal data from monitoring bores (the State Observation Bore Network) is paramount in sustainable groundwater management.

Extraordinarily, groundwater knowledge infrastructure is not only relatively sparse but going backwards. The State Observation Bore Network was severely reduced (~50%) in the past decade (mostly circa. 2016), resulting in a severe shortage of data now available for sustainable resource management, and measuring and monitoring the impacts of groundwater usage. Overall there is little rationalisation of the placement of observation bores or stream flow gauges, many of which were installed opportunistically or for reasons of convenience or to observe a particular problem rather than to provide an overall picture of resource condition and availability. The situation is not dissimilar for surface water stream gauging stations.

We understand from expert sources that the groundwater knowledge base in Victoria is so limited that information is generated from perhaps up to only 10% of groundwater bores in total (public and private). Further, licensing information is not routinely available or useable.

Groundwater data is held in many disparate organisations[26] and in discordant database structures. High quality groundwater data is regularly collected by water authorities and governments but rarely made available openly available in an accessible format. While the Visualising Victoria's Groundwater (VVG) online portal, constructed and operated by Federation University, is one of the most useful resources[27], it is unsupported. At the very least, FAIR data principles[28] (findable, accessible, interoperable, reusable) should be mandated for all data collected by the Victorian government.

The state of water information and knowledge infrastructure across southern Victoria is not fit for purpose. This is manifestly the case in relation to groundwater, but also affects surface water resources.

We propose the SWS set, as a matter of priority, a program for overhaul and expansion of water information and knowledge infrastructure**.** This program requires a thorough review of monitoring systems so that basic questions such as whether our groundwater and surface water use is environmentally sustainable and whether there is a decline in waterway health for reasons of flow can be answered. Key principles and starting points for that program need to include:

- Achievement of mandatory acquisition of data from all licensed water diversions, preferably via telemetry, within 10 years and its collation and distribution in a publicly accessible form
- Public availability and accessibility of all water diversion licences and rights through the Victorian Water Register
- Implementation of a water-monitoring program and water-monitoring infrastructure designed to produce, and capable of producing, an information base strategically orientated to the state of environmental assets and function and flow regimes consistent with sustainable use of water resources and health of water ecosystems across southern Victoria.
- Express application of policy implementing a precautionary approach to licensing, allocation or diversion/extraction decisions and conduct.

Inclusion of all forms of take in the licensing framework

Under the National Water Initiative of 2004, the Victorian government recognised that land use changes and other unlicensed uses such as stock and domestic use have the capacity to intercept large volumes of water and that this poses a risk to the integrity of other water entitlements. They agreed to record interception activities in catchments that are fully allocated (for example through a licensing system) and that interception activities above an agreed threshold size would require a water access entitlement.[29]

All four previous Sustainable Water Strategies (Central, Northern, Gippsland and Western Regions) have grappled with this issue but none has resulted in a system for recording interception activities or a requirement for a water access entitlement for new developments. All have taken a 'hotspot' approach, with the Western SWS proposing to give the minister powers to declare an intensive use management area.[30] But no real reform has eventuated and stock and domestic use and other interception activities remain outside the licensing framework, unmetered and unmeasured. The risk to other entitlement holders and the environment is only increasing as inflows decline.

We propose that all categories of take, including stock and domestic bores and dams, are brought into the licensing framework so all use can be measured, accounted for and managed if necessary.

Water recovery and restructuring options

Under the Water Act, a review to address the findings of a Long-Term Water Resource Assessment is about the only time the Water Minister is able to consider a permanent qualification of rights.[31] The findings of LTWRA for southern Victoria, that reduced water availability had a disproportionate impact on the environment's share of available water, could have triggered such a review. The Minister has chosen to conduct a Sustainable Water Strategy

26 E.g. In the public sector: DELWP (WMIS), DJPR, EPA, data.gov.vic.au, BoM, GA, data.gov.au, CSIRO, universities, Research Data Australia, municipalities, etc. In the private sector: water corporations, consultants, drillers, farmers, irrigators, industry, domestic users, citizen scientists, etc.

27 https://iwaponline.com/jh/article/18/2/238/25/Making-the-invisible-visible-the-impact-of

28 https://www.go-fair.org/fair-principles/

29 NWI s 55-57

30 DEPI (2011) Western Region Sustainable Water Strategy Action 5.3

31 *Water Act 1989* s33AAB

as a first response under s22P, thus delaying the ability to consider a permanent qualification of rights. We believe that the crisis facing our rivers demands that all water recovery and restructuring options are on the table, including the ability to permanently qualify rights.

The qualification of water rights may be primarily an issue where the water rights at issue continue to run, whether as a consequence of their indefinite character (such as bulk entitlements) or the instrument has not expired (for example under a section 51 license). Qualification of rights therefore only responds to existing rights. There are also opportunities to revise and/or limit 'take' or diversion rights, including for purposes of achieving sustainability and other policy outcomes, through response to progressing lapsing of rights. This approach is available and can be used in concert with restructuring options and strategies. Section 51 licenses are an obvious example.

S51 take and use licenses are granted for a 15-year period and subject to regular renewal. While there is an expectation these licenses will be renewed, this is not a right and there is the opportunity for the Minister to alter volumes, conditions etc at the time of renewal to relieve stress on rivers. Unused 'sleeper' licenses should not be automatically renewed in flow-stressed catchments where there is an environmental deficit which would be worsened if the licence were put to use.

In addition to blocking the option of qualification of rights, the draft SWS specifically excludes other forms of water recovery, such as buybacks from willing sellers. This exclusion is apparently in reference to the supposed adverse economic and social impacts of buybacks. In fact, recent research in the Murray-Darling Basin shows the many benefits of water buybacks, for example Wittwer states that 'buybacks remain the most efficient way of procuring water for the environment, yet have been blamed for damaging local economies. This is despite the willingness of farmers to participate in the buyback program and sell water to government'.[32] While buybacks have proved difficult to implement in southern Victoria catchments, this may be due to a lack of market awareness as much as unwillingness to sell. All buyback tenders in the Murray-Darling, with the exception of the extreme north where similar market barriers exist, have been oversubscribed.

Irrigated agriculture is not being asked to make any changes – and, indeed, it is proposed for marginal expansion - other than potential gains in irrigation efficiency which will be taxpayer-funded. It seems extraordinary that such a major user of water should be quarantined from any type of reform in view of the extreme pressure on water supply and on rivers.

We propose that all options for water recovery are on the table, including buybacks, changes to licence conditions and permanent qualification of rights if necessary.

We further propose:

- Consistent with the moratorium on new licences for consumptive take proposed above, no additional allocations are provided to irrigation uses of water from surface or groundwater sources across southern Victoria.
- Use limitation period on s 51 licences to require review of licences and/or conditions, in the context of reformed policy on licensing aligning with reform of water system 'caps'.
- Either through legislative change or policy implementation, establish a framework for review of section 51 and section 67 licences up to five years prior to the date of their expiry, with the provision of rights and conditions under the licence to be assessed against sustainability criteria in general and as applied to the specific conditions of the local water resource.

Interception activities and the problem of farm dams

The draft SWS estimates there are 126,000 farm dams (or stock and domestic dams or small catchment dams) in the entire region that hold 104GL of water (p165), more than the volume of the Thomson Reservoir. The cumulative impacts of these dams are largely unmanaged and their regulation is poor, convoluted and/or non-existent.

The impact of private dams on water ecosystems is complex but basically they function as an interception activity, controlling or diverting water in catchments, thereby impeding flow into natural systems. They prevent water flowing into rivers and creeks; they prevent water from flowing into reservoirs. Some are poorly sited and many poorly managed. They serve consumptive uses such as water for stock and domestic purposes. They can have ecological benefits, retaining water in a dehydrated landscape or contributing habitat values. Primarily they are not constructed for ecological purposes and the weight of benefits is likely to be against those values. The SWS states with little equivocation, 'While in some cases small catchment dams can provide a drought refuge for wildlife, which has environmental benefits, their net effect on the environment is harmful'. (p 165)

In the Central and Gippsland Regions, many dams in periurban areas on the so-called lifestyle 'ten-acre block are merely aesthetic. Landowners like the look of a big dam, especially when placed strategically in front of the house. Such dams deprive creeks and watercourses of necessary flows.

Currently, there is no limit on the number of these dams that can be built, nor on the number of dams built on any one property, and the number is increasing, as the SWS identifies. These dams are particularly pernicious in their downstream impacts during drought as they capture the first flows of any rain event. In addition, small catchment dams may be shallow and therefore prone to substantial evaporation losses. Some also fill these dams with illegal diversions from waterways. By reducing flows, farm dams impact on other users and agricultural productivity downstream of the dam.

32 Wittwer, G (2020) Modelling variants of the Murray-Darling Basin Plan in the context of adverse conditions in the Basin. See also work by Sarah Wheeler et al

Authorities rarely monitor small catchment dams for compliance with license conditions and are typically reluctant to enforce licence conditions and any regulations. There is no program to locate illegal dams on waterways or unlicenced 'large' dams or illegal diversions. Authorities are slow to respond to community complaints about water theft from overland flows and waterways.

Consistent with its overall tenor, the consultation draft acknowledges the issue of farm dams being uncontrolled and poorly managed and designed, but fails to provide a clear path forward over the next 50 years to address the problem.

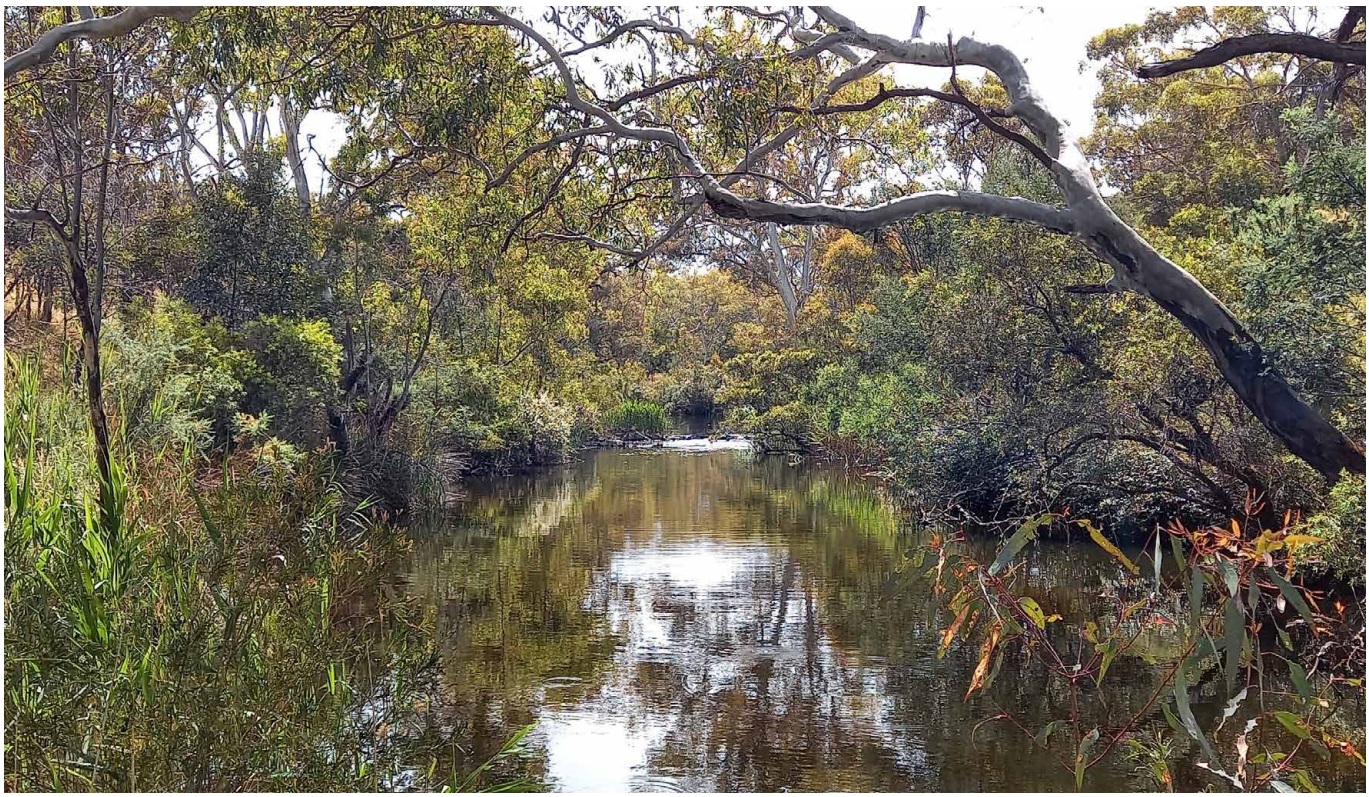
The solution proposed in Proposed Direction 8-4 is to monitor emerging risks and investigate hotspots, and then to develop 'community led' management options.

We propose a more robust program be developed that extends beyond monitoring to a clear path to action:

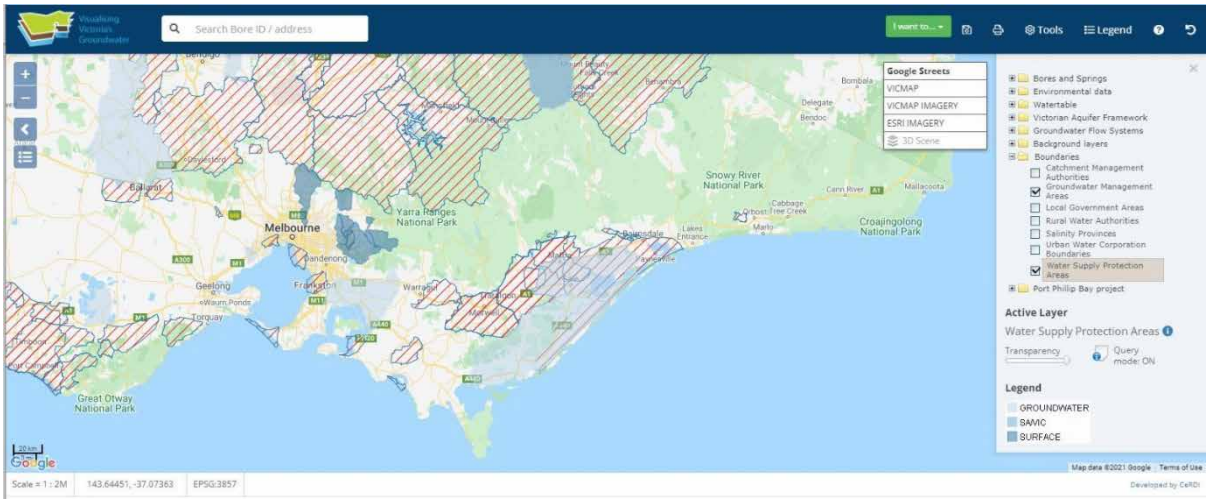
- A program to license all farm (private) dams, bringing them into the water management system including through any necessary amendments to the Water Act.
- Development of 'reasonableness' provisions for licensing of farm dams
- Flow-stressed, at risk or 'hotspot' catchments to be declared Water Supply Protection Areas, triggering management plan requirements. Management plans should include, subject to assessment of cumulative impacts of private dams on the water system, appropriate volumetric constraints, conditions applicable to protection of the environment, and management of cumulative impacts,[33] in accordance with identified ecological objectives for the specific water system.
- An education program on the impact of farm dams.
- A moratorium on large dams, 'aesthetic' dams, or dams on waterways or watercourses presently subject to licensing until above measures implemented.
- Dams that are for aesthetic purposes are decommissioned under amendments to the Water Act. Owners are required to demonstrate reasonable use to avoid decommissioning.
- Dams used to irrigate gardens used for commercial purposes such as wedding venues be classified as irrigation dams.
- Incentives for permanently decommissioning licenced small catchment dams, perhaps in the form of a covenant on the land.
- Current rules and regulations be properly and promptly enforced by water authorities, including bypasses for onstream dams. If a licence holder is found to be in breach, then the licence is withdrawn and the dam decommissioned.
- The Moorabool be selected as a target area to monitor, educate and to improve small catchment dam management under the current regime and to test amendments to regulations and legislation.
- Monitoring include identifying the use of a dam where possible and why particular sorts of dams are growing in particular areas.

33 See *Water Act 1989* (Vic), s 32A

Moorabool River near Meredith. Image: Cameron Steele



GMAs AND WSPAs



Source: VVG[34]

Integration of surface water and groundwater management

Water management should be integrated (there is only one hydrologic cycle) rather than compartmentalised into components of the hydrologic cycle. Terrestrial surface waters, marine waters and groundwaters are interconnected and the management of one component will ultimately show a response in the other components. The Victorian government committed through the National Water Initiative to recognise connectivity between surface and groundwater and develop integrated management plans where the degree of connectivity is high.[35] As far as we are aware, Southern Rural Water has not created an integrated management plan for ground and surface water in any catchment in southern Victoria[36], despite the fact that a high degree of interaction exists in several catchments, for example Moorabool, Barwon, Maribyrnong and Avon. The Victorian Parliament in passing the Water Act intended that integrated water cycle management be an element of the water management regime[37] but this has not been put into practice.

Groundwater

The conceptualisation of groundwater in the draft SWS is flawed. The statement (Section 2.3) *'Groundwater use is capped and fully allocated in most areas of the region (Figure 2.9). Less than 6 per cent (about 14 gigalitres) of groundwater is unallocated in the region'* is incorrect. Groundwater is not just present in the Groundwater Management Areas (GMAs) shown in Figure 2.9. The groundwater systems outside those areas, usually termed unincorporated areas, also need to be managed, especially for their ecosystem services. Looking at the map, it is apparent that the volume of groundwater outside of the GMAs and Water Supply Protection Areas (WSPAs) is a significant volume. This groundwater in the UAs contributes to baseflow in streams and wetlands within high value environmental areas, such as rivers, coastal wetlands, Ramsar sites and National Parks.

Similarly, the statement that *"Not all groundwater systems are affected by changes in climate, especially groundwater in confined aquifers..."* is simply not true. All groundwater is ultimately replenished, within the overall hydrologic cycle, from meteoric sources and moves from recharge to discharge. Changes in recharge due to more or less precipitation ultimately affects all groundwater resources.

Groundwater management is conveniently parked for future action: '*The Victorian Government will develop a statewide Groundwater Management Strategy to ensure that our groundwater resources will be managed...*' (Section 7.3). While DELWP staff have suggested the 'GM 2030' strategy will be finalised before the release of the final SWS, no timeline is given in the Discussion Draft, and similar reforms proposed in the past (for example the Secure Allocations Future Entitlements (SAFE) project, 2012[38]) have not eventuated. Development of a statewide strategy is a matter of urgency, particularly to guide the development of integrated surface and groundwater planning and to review criteria for setting PCVs.

The draft SWS contends that groundwater levels are stable across the region. The fact is that monitoring shows a decline in groundwater levels across many parts of the region over the past four decades. The figure on the following page illustrates a few examples of bores to demonstrate the fact.

34 https://www.vvg.org.au/vvg_map.php?agreement=Agree%2Band%2BContinue&view=19746_16748e3

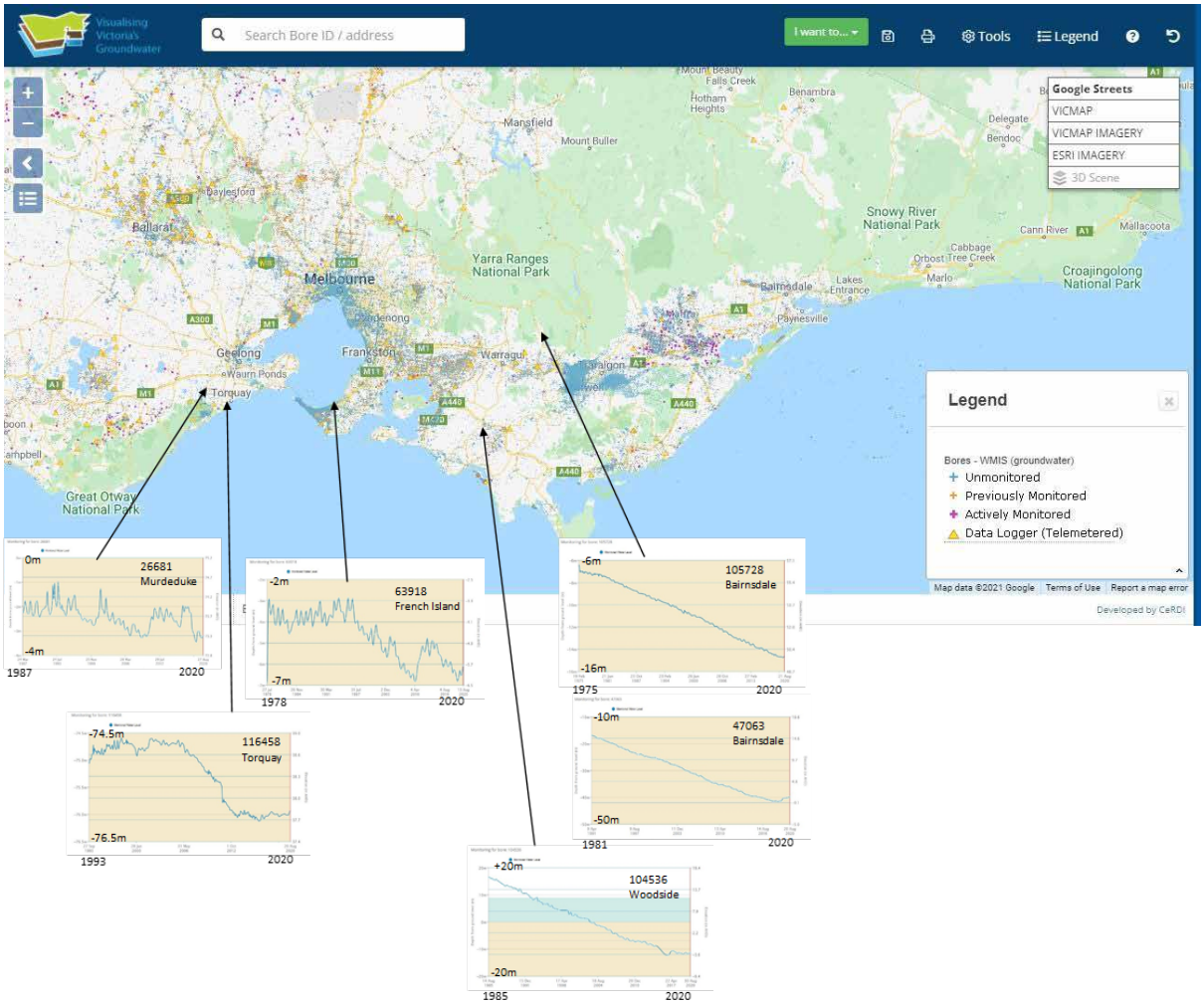
35 National Water Initiative (2004) Cl23(x)

36 http://www.srw.com.au/publications/

37 *Water Act 1989* (Vic), s 1: 'The Act has the following purposes... (b) to provide for the integrated management of all aspects of the terrestrial phase of the water cycle... (f) to eliminate inconsistencies in the treatment of surface and groundwater resources and waterways.'

38 https://vgls.sdp.sirsidynix.net.au/client/search/asset/1018015

SELECTED EXAMPLES OF DECLINING GROUNDWATER LEVELS



Source: VVG

Groundwater monitoring and management is biased, for historic reasons, to consumptive uses and consequently limited. Significantly, even highly saline groundwater can provide ecosystem services by discharging baseflow to groundwater dependent ecosystems (GDEs) for example. Therefore groundwater management should also extend beyond 'good water' to include resources that service other species or provide ecosystem services. In other words, the focus of sustainable water management should have an ecocentric viewpoint. The region contains many known GDEs (figures below) including the Gippsland Lakes, Westernport and Bellarine wetlands, forests and heathlands.

Under the Water Act, taking groundwater for domestic and stock water usage (known as D&S) is a right and provided freely and unmetered, whereas urban, commercial, industrial, irrigation and other usages require a 'take & use' licence and are metered. The volumes of D&S are completely unknown[39] but are generally estimated to be less than metered usage.[40] In Gippsland D&S water has been valued at $900/ML compared to $1,400/ML for agribusiness and $3,800/ML for urban and industrial water,[41] That makes D&S water considerably cheaper than urban water[42] (and indeed, free of charge for the user). The unknown temporal and volume usage of D&S groundwater is a large uncertainty when attempting to calculate a water budget for an aquifer. Typically, considerably more water is extracted during droughts, which is when the ecosystem services provided by groundwater are most needed and under severe stress. Sustainable groundwater management needs to improve the certainty around how much D&S water is being extracted and at what times. The most logical method to do this is through a more complete groundwater monitoring network, including metering of D&S bores.

The high degree of uncertainty and need for express application of policy reflecting a precautionary approach to groundwater management is dealt with elsewhere in this response.

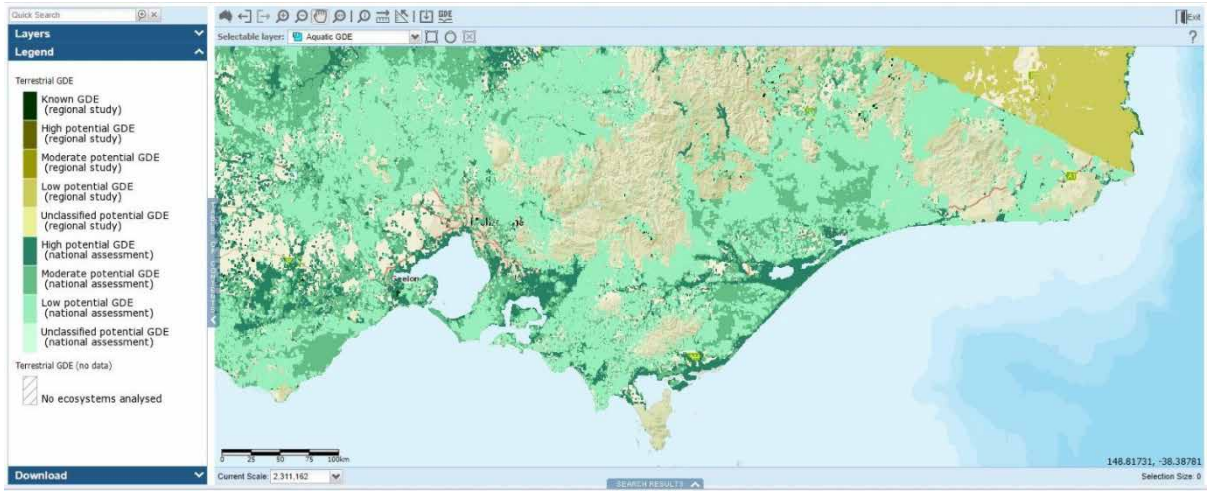
39 http://www.srw.com.au/wp-content/uploads/2016/03/GGA_SmallSize-1.pdf (page 24)

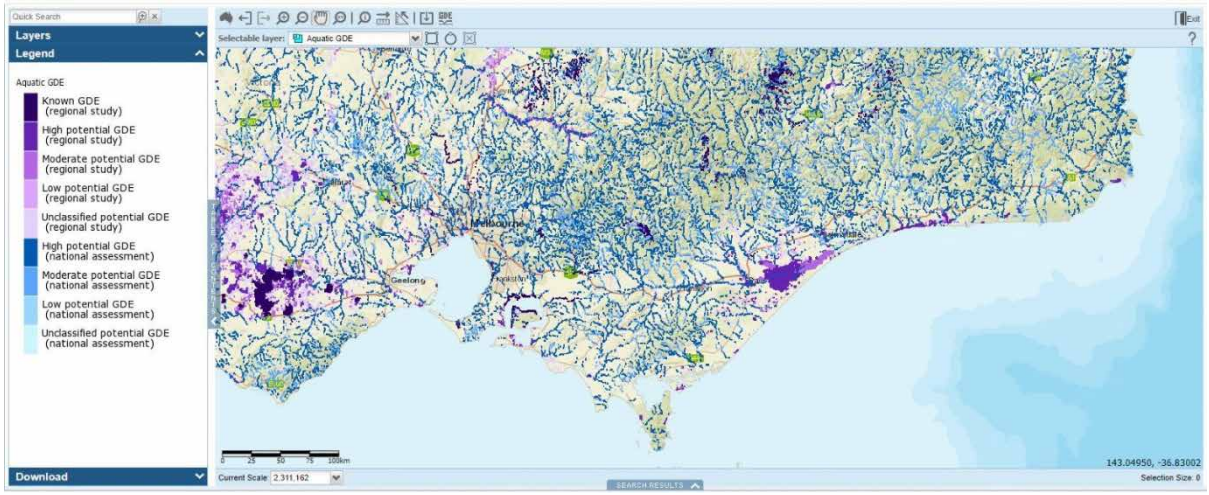
40 .http://www.srw.com.au/wp-content/uploads/2016/03/Port-Phillip-GW-Atlas-Complete-Web.pdf (page 26)

41 http://www.srw.com.au/wp-content/uploads/2016/03/GGA_SmallSize-1.pdf (page 29)

42 http://www.srw.com.au/wp-content/uploads/2016/03/Port-Phillip-GW-Atlas-Complete-Web.pdf (page 32)

KNOWN AQUATIC AND TERRESTRIAL GDES





Source: BoM

We propose that as part of the development of the Victorian Groundwater Strategy, the Victorian government identifies catchments with a high degree of connectivity and develops appropriate management plans that cover both surface and groundwater.

We further propose that groundwater management strategy includes, as priority focus, risks to groundwater dependent ecosystems, significant direct or indirect risks to other environmental assets (such as surface water quality impacts), and implementation of measures to prevent or ameliorate these risks.

We recommend overhaul of groundwater information elsewhere in this response.

Gippsland issues

Mine rehabilitation in the Latrobe Valley

The SWS should be the vehicle for making long-term decisions about how water is shared between users. On the issue of the use of surface water for mine rehabilitation, it defers to the Latrobe Valley Regional Rehabilitation Strategy (for which environmental harm to rivers is only one of many considerations) and postpones a decision to some unspecified future date.

We contend that the use of waters from natural systems – that is, river waters and their diversion – to enable mine rehabilitation in the Latrobe Valley must be rejected unequivocally in the SWS. Mine rehabilitation based on use of water from the natural hydrological cycle (surface and/or groundwater) would have fundamental adverse consequences on water ecosystems across the La Trobe system including the Gippsland Lakes. In effect, it is a folly that would effectively lead to accelerated ecological collapse of water-dependent ecosystems downstream of the Latrobe Valley.

The Victorian government must consider options for mine rehabilitation that do not require water or at most the minimal volumes required for pit stability. Such water as is required must be sourced from alternative sources with the Eastern Treatment Plant as an obvious candidate. While water treatment at the plant would need to be upgraded to ensure a suitable supply, construction of a pipeline to the Latrobe Valley could also supply recycled water to towns and irrigation enterprises en route. It could be part of the national water grid envisaged by the federal government. It would also resolve the problem of finding a use for the water produced by the ETP and put an end to ocean outfall.

We propose that the SWS expressly rule out the use of river water from the Latrobe River system for mine rehabilitation in the Latrobe Valley to avoid catastrophic consequences for the Latrobe River and Gippsland Lakes. The SWS should provide direction to the Latrobe Valley Regional Rehabilitation Strategy on alternative sources of water that are potentially available.

Progressive expansion of environmental and Traditional Owner entitlements resulting from power industry decommissioning

The Latrobe River and its tributary the Tyers River have among the largest environmental water deficits in the region, 49 GL and 33 GL respectively (p56), and are highly flow stressed. The progressive decommissioning of the Latrobe Valley power stations provides the opportunity to rethink the ways in which water is used in the valley and reallocate water to the environment and to Traditional Owners for cultural purposes. The draft SWS recognises the opportunity (proposed direction 10-4} but holds back on firm proposals to improve the health of the region's rivers.

Latrobe River, Morwell. Image: Tracey Anton

The ¾ bench entitlement in Blue Rock dam is currently unused and is supporting both environmental flows in the Latrobe and the reliability of other entitlements. Were it to be re-allocated for consumptive use (irrigation or urban use) these benefits would cease, and both the river and existing users would be disadvantaged.

Similar considerations apply to the Latrobe drought reserve held in Blue Rock dam. It has rarely been used since its creation as the result of the Gippsland Region Sustainable Water Strategy in 2011. As power generation declines it is even less likely to be required for its intended purpose of back up supply for the generators. Again as an unused entitlement it is providing environmental and reliability benefits.

Consumptive entitlements that will become available as the power stations are decommissioned are those held by the generators. These are substantial volumes of water (Table 10.4) The SWS envisages that they will be used for mine rehabilitation but as argued above this is will lead to ecological disaster. Rather, these entitlements could be shared between the environment, Traditional Owners and growing consumptive demand in the region, and shore up the reliability of existing entitlements.

Freeing up the use of the power generator entitlements to satisfy needs other than mine rehabilitation would enable the ¾ bench and the Blue Rock drought reserve to be reallocated to the environment and for Traditional Owner use. This could avoid long-term catastrophic outcomes for the highly stressed river systems and the Gippsland Lakes, both in terms of decline in flows (compounding current historic flow decline and those occurring and anticipated under the climate shift) and in terms of water quality and contamination outcomes of any flows via the connected groundwater-surface water systems.

We propose that the ¾ bench and the Latrobe drought reserve entitlements be reallocated for environmental and Traditional Owner purposes, and that current power generation entitlements be shared between the environment, Traditional Owners and future consumptive use as they become available for reallocation.

Irrigation development in Gippsland

The Victorian government has already invested in a feasibility study for the Southern Victoria Irrigation Development project. This project is irrigator-led and proposes the development of new irrigation areas in the Latrobe and Avon valleys. The government appears to be supporting it primarily as a regional development opportunity as part of the transition away from power generation, although the idea of highly-trained electricity workers becoming vegetable pickers seems fanciful.

The Avon River focus area would essentially be an extension of the Macalister Irrigation District with water sourced from savings in the MID. The feasibility study estimates potential demand as 6-8GL/year with potential growth to 10GL/year.[43] The environmental requirements of the Avon River have not yet been developed.

The Macalister River is flow stressed with an environmental water deficit of 22 GL. 12.6 GL is proposed to be returned to the river over the next 10 years, sourced primarily from irrigation upgrades in the MID. As the irrigation district has already been extensively modernised to provide more water for irrigators and the environment, it is difficult to imagine where a further 20 GL to meet environmental needs and the proposed expansion could be found in a cost effective way. Water recovery costs in the Goulburn-Murray and Sunraysia Irrigation Districts have increase to around $11,000/ML following progressive rounds of modernisation.[44]

The Latrobe River focus area has earmarked Blue Rock dam as a potential source of water, and demand is estimated at 9–13 GL/year with potential growth to 20GL/year. The water would be accessed from 'run of river' flows which would require around a 10% share of inflows to support them. As there is currently no unallocated water available in Blue Rock, this water would have to come from the ¾ bench entitlement, the Latrobe drought reserve or the electricity generator's share. As discussed above we consider re-allocation of the power generator entitlements to be the only potential source of water for consumptive use.

We propose that the SWS rule out the allocation of water for future irrigation development in the region until environmental water deficits have been reversed.

43 RMCG (2021) Southern Victoria Irrigation Development Project Phase 3

44 https://www.waterefficiencyproject.com.au/

Concerned Waterways Alliance

The Concerned Waterways Alliance represents the following:

Environmental Justice Australia

Environment Victoria

First Friends of Dandenong Creek

Friends of the Barwon

Friends of Latrobe Water

Friends of Maribyrnong River

Friends of Merri Creek

Friends of Steele Creek

Gippsland Environment Group

Jacksons Creek EcoNetwork

People for a Living Moorabool

Yarra Riverkeeper Association

The Waterways Network

Werribee River Association

Further information

Dr Bruce Lindsay, Senior Lawyer, Environmental Justice Australia

admin@envirojustice.org.au

Front cover image: Moorabool River at Batesford. by Cameron Steele

Back cover image: Gungarlin River , flowing past rock face below weir on 5 October 2017 - first flows since 1965, by Louise Crisp