FRIENDS OF THE GIPPSLAND LAKES PARKS AND RESERVES

Critical Evaluation of the Ricardo (2025) Review on Latrobe Valley Mine Water Pricing

Integrating Ecological, Carbon and Cultural Values in Water Pricing for Sustainable Mine Rehabilitation and the protection of the Gippsland Lakes

Abstract

This critique urges incorporating ecological, cultural, and carbon sequestration values into water pricing for Latrobe mine rehabilitation to prevent environmental degradation, with a focus on the Gippsland Lakes.

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Executive Summary

This report presents a critical evaluation of the Ricardo (2025) review into surface water pricing for Latrobe Valley mine rehabilitation. Ricardo recommended an "efficient pricing band" of $200–$260 per megalitre (ML) based on agricultural opportunity costs but failed to include non-market ecological, cultural, and strategic urban water supply values. This omission risks fundamentally undervaluing a finite public resource that is subject to escalating demand pressures. As a result, it may distort decision-making in ways that contribute to long-term environmental degradation, cultural loss, and financial liabilities.

The report's central analytical assumption fails to adequately account for the inherent scarcity of the resource in question—low-cost, gravity-fed freshwater from forested catchments—which is in progressive decline.

The Latrobe River system is already over-extracted, with a 129 GL/year environmental flow deficit contributing to salinity intrusion, wetland degradation, and biodiversity loss in the internationally listed Gippsland Lakes Ramsar site. Wetlands in the system provide water purification, shoreline protection, fisheries support, and carbon sequestration services, with an estimated ecosystem value exceeding $1,600/ML. Yet Ricardo effectively assigned these services a value of zero.

Crucially, the report also excluded the cultural value of water to Gunaikurnai Traditional Owners, despite government commitments to return water entitlements for cultural use under the *Water is Life* roadmap. Ignoring these values undermines water justice, violates principles of self-determination, and entrenches colonial legacies in water allocation.

The report recommends recalibrating the water price to reflect full ecological, climate, and cultural opportunity costs – with a revised indicative range of $1,892–$1,972/ML. It also proposes reinvesting proceeds into environmental restoration and Traditional Owner initiatives, adopting regulatory safeguards, and embedding the "living entity"

concept into pricing frameworks. Only through such reforms can Victoria achieve just, sustainable water governance and protect the Latrobe River for future generations.

Introduction

The Latrobe River (Durt'yowan in Gunaikurnai language) flows from Victoria's Alps through Gippsland into the international Ramsar Convention-protected Gippsland Lakes. It has sustained communities, culture, and ecosystems for thousands of years. It has been proposed that a substantial volume of this river water be diverted to rehabilitating three open-cut coal mines in the Latrobe Valley as they close, by filling the mine pits with water. The Victorian Department of Energy, Environment and Climate Action (DEECA) commissioned a review (Ricardo, 2025) to determine an "efficient pricing band" for potential new surface water entitlements for mine rehabilitation. The Ricardo (2025) report concludes that an indicative price range of $200–$260 per megalitre (ML) per year for this water would be appropriate. This conclusion is primarily based on the "opportunity cost" in alternative uses like irrigation. However, crucially, this pricing recommendation totally *excluded the environmental value of water and the cultural water rights of Traditional Owners*, treating these non-market values as zero due to difficulties in quantification. This omission raises serious concerns given the Latrobe River system's existing ecological stress and the aspirations of Traditional Owners for water justice.

This report critically evaluates the Ricardo (2025) review, focusing on its failure to account for: (1) the environmental value of water, including the ongoing 129 GL/year shortfall of environmental flows in the Latrobe system and the vulnerability of downstream ecosystems (notably the Gippsland Lakes Ramsar wetlands); and (2) the cultural value of water and Traditional Owners' rights, as articulated in policies like *Water is Life: Traditional Owner Access to Water Roadmap* (DELWP, 2022). It examines how excluding these considerations has led to an **undervaluation of water** diverted for mine rehabilitation, and discusses the legal, policy, and ethical implications of that undervaluation. In doing so, the analysis draws on the Central and Gippsland Region Sustainable Water Strategy (CGRSWS 2022), the West Gippsland Regional Catchment Strategy, Victorian Water Act 1989 provisions, the EPA's General Environmental Duty, and the concept of waterways as living entities in both Indigenous and international law. Finally, a set of recommendations is provided to ensure water pricing reflects full ecological and cultural opportunity costs, thereby aligning with sustainable water management principles and justice for Traditional Owners.

Exclusion of Environmental Water Values in the Efficient Pricing Band

Ecological Condition of the Latrobe River and Gippsland Lakes

The Latrobe River system is already severely flow-stressed and ecologically vulnerable, a fact well-documented in regional water strategies. The **Central and Gippsland Region Sustainable Water Strategy (CGRSWS, 2022)** notes that the Latrobe River and its estuary suffer an *environmental water deficit of approximately 129 GL per year*, meaning that more volume is needed in addition to current flows to maintain river and wetland health. In other words, the river is effectively 'on life support, needing more water, not less'. Over a century of water diversions for power generation, irrigation, and urban use, combined with the permanent opening of the Gippsland Lakes to the sea in 1889, has dramatically altered flow regimes. Freshwater inflows have declined, leading to rising salinity in the lower Latrobe wetlands (Heart Morass, Dowd Morass) and a long-term shift from freshwater to brackish conditions in parts of the Gippsland Lakes system.

The Gippsland Lakes, listed as Wetlands of International Importance under the Ramsar Convention, have experienced biodiversity loss linked to reduced flows and saltwater intrusion. For example, critical wetland habitats that once supported rich freshwater flora are transitioning to saltmarsh, threatening species like the vulnerable green and golden bell frog and internationally protected migratory bird species, such a s Latham's snipe. The Index of Stream Condition rates the Latrobe River's condition as "Poor" to "Very Poor", with hydrology (flow alteration) a key weakness. These signs point to an ecosystem in distress, desperately needing additional flows to recover.

The **Gippsland Lakes Ramsar Site Management Plan** highlights the necessity for adequate freshwater inflows, noting that one-third of average annual flows in the Latrobe, Thomson, and Macalister Rivers are currently diverted, with only significant floods reaching the lower Latrobe wetlands (East Gippsland Catchment Management Authority [EGCMA], 2024). Reduced inflows increase salinity in the Gippsland Lakes, adversely affecting habitat quality. Climate change projections suggest further significant reductions in Latrobe River flows, increasing ecological risk (EGCMA, 2024). The CGRSWS explicitly aims to progressively return water to the environment to mitigate these impacts (DELWP, 2022).

In this context, allocating significant volumes of water to fill mine pits – reportedly on the order of "more than four Sydney Harbours' worth of water" (potentially >2,800 GL over 30 years) from an already stressed system – poses a grave risk to downstream environments. Yet the Ricardo (2025) report's efficient pricing band did not incorporate any value for leaving water in the river to sustain these ecosystems. By the report's own

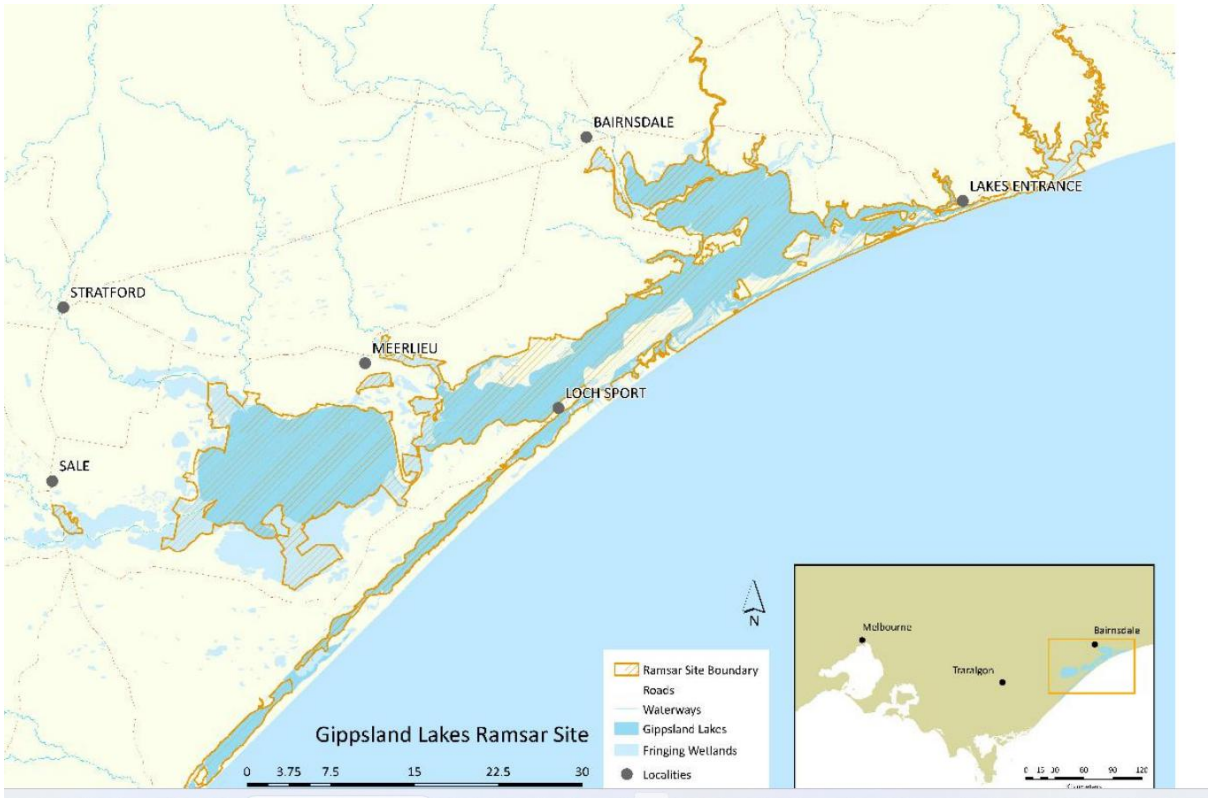
admission, *"quantifying the opportunity cost of water for environmental uses is more complex"* than for irrigation because there are no market prices, and thus the opportunity cost of water for the environment "has not influenced the indicative price range" it recommended.

In effect, the analysis treated the environmental value of water as zero in the pricing decision.

This is a critical oversight: just because ecological benefits are not traded in markets does not mean they are negligible. On the contrary, water left to flow down the Latrobe River has high *non-market value* – it underpins the health of a Ramsar-listed wetland complex, fisheries, tourism, recreation, regional identity, and the intrinsic rights of nature.

As the **West Gippsland Regional Catchment Strategy** emphasizes, maintaining river flows is essential to support a "diverse range of environmental, economic, social and Aboriginal cultural values" in the region (WGCMA, 2025). Each litre of water diverted from a flow-stressed river carries an *opportunity cost to the environment* in terms of lost habitat and degraded ecosystem services.

Preliminary Valuation of Ecosystem Services in the Latrobe River and Gippsland Lakes Ramsar Site (pending a formal study)



The Latrobe River and Gippsland Lakes form a distinctive coastal-estuarine ecosystem that delivers essential services, including storm protection, nutrient cycling, habitat provision, fisheries support, carbon storage, and recreation. Establishing the economic value of these services is critical to ensure that water pricing frameworks accurately reflect their true worth and guide sustainable resource allocation. Although the Ramsar site covers approximately 60,000 hectares, only a portion comprises ecologically active wetland areas such as tidal shallow marshes (1500ha), tall marshes (1800ha), saltmarsh mudflats (4000ha), and swamp scrub (5500ha) (Brooks & Hale, 2024). The estimated extent of Ramsar fringing wetlands in 2023 was approximately 12800ha, with a further ~4,855 ha existing outside the protected area. This brings the total extent of fringing wetlands in the Gippsland Lakes system to an **estimated 17,655 ha**, of which around 27.5% lies beyond the Ramsar designation (Brooks & Hale, 2024b). Australian and global studies provide useful benchmarks for estimating the ecosystem service value of these estuarine wetlands.

Nutrient filtering and water purification services:

The Latrobe River and Gippsland Lakes wetlands function as critical natural filtration systems, effectively removing excessive nutrients and pollutants, thus safeguarding water quality and ecosystem health. The potential impact of excessive nutrients entering the Gippsland

Lakes is widespread toxic algae blooms, as recently occurred in South Australia, an ecological and economic disaster, and a politically sensitive event.

Recent analyses indicate that wetland nutrient filtration values can exceed $7,000 per hectare annually (State Government of Victoria, 2023). Across the 17655ha (approx.) of fringing wetlands this translates to around **A$123.58 million p.a**. in filtration and purification services. Converting this into a per-megalitre (ML) benchmark price using the estimated annual environmental water deficit of 129,000 ML, yields **approximately A$958 / ML** (A$24.78 million ÷ 129,000 ML). Reductions in freshwater inflows compromise this filtration capability, impacting other ecosystem values, such as habitat and biodiversity provision, recreational fishing and regional tourism.

Shoreline protection benefits of wetlands: Recent valuation work by the Australian Government highlights the significant protective services provided by coastal wetlands in attenuating waves, stabilising shorelines, and reducing disaster risk. A comprehensive review of Australian case studies estimated the disaster risk reduction value of coastal wetlands to range between INT$2,570–11,477 per hectare per year, with temperate saltmarsh and swamp scrub habitats performing particularly strongly in semi-enclosed lagoon systems (IDEEA Group, 2020). Applying a conservative lower-bound value of AUD 4,500 per hectare per year to the 17655 ha (approx.) of fringing wetlands within the Gippsland Lakes system yields an annual value of approximately $ **79.45 million**. To relate these ecosystem values to water pricing, these annual figures can be converted into a per-megalitre (ML) benchmark using the estimated annual environmental water deficit of 129 gigalitres (GL), equivalent to 129,000 ML. This yields approximately **$615.87 / ML** ($79.45 million ÷ 129,000 ML). This valuation underscores the need for water pricing frameworks to incorporate the shoreline protection and flood mitigation benefits provided by fringing wetlands, ensuring that such critical ecosystem services are internalised in allocation decisions.

Wetland carbon sequestration and storage (blue carbon): The carbon storage and sequestration value of the Gippsland Lakes' coastal wetlands adds a significant climate regulation dimension to the ecosystem services they provide. According to Blue Carbon Lab (2023), Victorian coastal wetlands (saltmarsh) store 2.42 tonnes CO_2/ha/yr (Costa et al., 2022). At a carbon price of AUD47 per tonne, based on the carbon price in Australia in December 2021 (Clean Energy Regulator 2022b) applied to 2.42 tonnes carbon sequestration rate for all fringing wetlands around the Gippsland Lakes (17655ha) we derive an indicative blue carbon value of approximately A$2 million p.a. in current market terms (or $113.74 / ha p.a.). To preserve this carbon stock over a 40-year horizon, the implicit value of maintaining freshwater inflows equates to approximately A$15.57 per megalitre (ML) ($2,000,000 x 40 / total inflow deficit 129,000 ML x 40 years). In addition, if wetland degradation leads to the release of even 50% of this stored carbon—as can occur when soils dry and oxidise—the avoided emissions value alone

would contribute a further A$7.78 per ML, based on conservative 2021 carbon market rates of A$47 per tonne CO_2 equivalent. Together, these components suggest a combined **carbon-related premium of approximately A$23.35 per ML**, which should be factored into water pricing decisions for mine rehabilitation

An ecosystem service premium in the range of $1573 / ML ($958+$615) combined with ecological restoration cost estimates of approximately A$48–58/ML and the carbon-related premium of A$23.35 /ML, indicates that the true ecological and climate opportunity cost of diverting water significantly exceeds Ricardo's proposed upper bound of $260/ML. The first order estimate of **combined environmental water value is approximately AUD $1644–1654 per ML**, providing a more robust, evidence-based justification for substantially increasing the price of water allocated to mine rehabilitation.

Habitat loss and species decline: Reduced flows reduce the extent and condition of wetland areas and degrade habitat for threatened native fish and waterbirds. The opportunity cost here includes the loss of future fishing opportunities, the potential collapse of certain species (with flow-on effects up the food chain), and the loss of biodiversity that supports tourism and bolsters the region's reputation as a site of international conservation importance under agreements such as the Ramsar Convention. Furthermore, if ecosystems collapse, governments may be forced into costly recovery efforts—such as artificial fish stocking programs, wetland rehabilitation works, or even engineered environmental flow releases—all of which are financial costs that stem from under-allocating water to the environment in the first place. By not accounting for habitat service value, we under-price water and risk ecosystem damage that is expensive or impossible to reverse.

Forgone fisheries and tourism benefits: Recreational fishing in the Gippsland Lakes and Latrobe River system represents substantial economic and social value. Recent studies have estimated the annual economic impact of recreational fishing in Gippsland to exceed **$163 million**, significantly contributing to local economies through tourism, equipment sales, accommodation, and related services (Gippsland Lakes Recreational Fishing Report, 2023). Declines in water quality and freshwater inflows directly threaten fish populations and recreational fishing quality, adversely impacting regional economic stability and social wellbeing. Surveys conducted in 2023 reveal heightened angler dissatisfaction linked to declining fish health and abundance, with clear correlations to reduced freshwater inflows (Fisheries Victoria, 2023).

Every megalitre of water kept instream contributes to healthier fish populations and better recreation (angling, boating). If that megalitre is instead given to filling mine pits and the river and downstream environments are further stressed, the lost economic value might be the fish not caught or the tourists who choose another destination. These losses may seem diffuse, but they accumulate. For instance, if environmental

flow reductions led to even a 10% drop in tourism in the Gippsland Lakes, the region could lose in the order of $35+ million per year given a baseline of $350 million tourism value (Tourism Victoria, 2023). That far exceeds the per-ML value of water for irrigation in the region (which the Ricardo report estimated in the low hundreds of dollars per ML). In other words, the marginal value of water left in nature can be very high, even if it's not captured by a single user's willingness-to-pay. Not recognizing this biases decisions toward over-extraction.

In summary, excluding ecosystem service valuations effectively sets **their price at zero**, leading to water being over-allocated to uses like mining or irrigation from society's perspective. This is inefficient and inequitable—inefficient because it can result in net economic loss (the damage outweighs the private gain), and inequitable because it ignores communities (including Traditional Owners) who value the river's health and derive well-being from it. The Ricardo report itself emphasizes that water's value in environment and cultural uses could lie in a "broader range" potentially higher than the farming value (Ricardo, 2025). By not integrating that, **the indicative price range they gave was skewed extremely low**.

The true opportunity cost of taking water from the Latrobe system is much higher than the irrigation value when we account for water's full economic and environmental contributions, equating to an indicative, base opportunity cost price range of A**$1892-$1972/ML** without even including the cost of cultural water licenses.

Consequences of Ignoring Environmental Opportunity Costs

By excluding environmental water needs, the recommended price band of $200–$260/ML significantly undervalues the water resource and risks over-allocation. An artificially low price encourages maximum uptake of river water for mine rehab, effectively prioritizing mine pit filling over ecological, cultural and other economic water needs. This runs directly counter to Victorian government policy. Notably, the CGRSWS set an objective to *return almost 100 GL of water to the environment over 10 years* in systems like the Latrobe to begin restoring ecological health. Furthermore, section 40 of the Water Act 1989 (Vic) mandates that in considering any new water allocation, the Minister for Water and advisors must take into account *"the need to protect the environment, including the riverine and riparian environment"* alongside other needs. Pricing is an integral part of allocation: a price that ignores environmental costs will bias decisions against protection of the river. In an economically efficient framework, the *opportunity cost* of water should reflect the value of the next-best use – in this case, leaving water in-stream for environmental purposes. Ricardo (2025) acknowledges that *"water has value as a finite natural resource fundamental to…the environment"* and

that pricing should reflect *"both use and non-use values"*. It also concedes that in a flow-stressed system like the Latrobe, *"the more water is retained in waterways to reflect natural flow conditions, the better the environmental outcomes"*, especially under a drying climate. Despite this, the report failed to translate those insights into its pricing, due to the "complexity" of monetization. This is a **classic case of market failure**: not pricing what truly matters.

One consequence is that the proposed price does not account for the ecological damage costs (including increased carbon emissions from wetland loss) or restoration costs that may result from further flow reductions. For instance, if reduced flows accelerate the decline of the Gippsland Lakes' health, the public may later bear costs of emergency environmental water releases, carbon emission offsets, habitat rehabilitation or the decline in water-based tourism for instance. Under Victoria's **Environment Protection Act 2017**, all persons have a General Environmental Duty to minimize risks of environmental harm from their activities. Allowing a company to take large volumes of water without reflecting the harm to ecosystems in the price effectively externalizes environmental costs, arguably contravening the polluter-pays principle embedded in the law. Moreover, Australia has international obligations to maintain the ecological character of Ramsar designated wetlands; failing to do so could have legal implications and reputational costs.

Crucially, mis-pricing water also distorts decision-making around mine rehabilitation options. Environment Victoria (2025) notes that a 2024 study of alternative water sources for the mines (such as using recycled or desalinated water) dismissed those options as too costly because it assumed river water was very cheap. If river water were priced closer to its true ecological value – i.e. higher – then alternatives might become economically competitive to the energy companies, potentially sparing the river from further extractions.

In effect, a low water price creates a perverse incentive to use the river even when more sustainable (but initially costlier) options exist. By contrast, setting a more realistic price could encourage innovation in mine rehabilitation, such as sourcing water from treated wastewater or stormwater, or even reconsidering rehabilitation designs that require less water.

The Ricardo report itself provides evidence that the *upper bound of water value* could be much higher in certain contexts: for example, the levelized cost of supplying water via infrastructure (like new pipelines or alternative sources) could be on the order of $3,000/ML – an order of magnitude above the suggested price band. While that $3,000/ML figure represents a "standalone" cost of new supply (and thus a theoretical

ceiling), it starkly illustrates how far off the mark a $200/ML price would be if environmental externalities were internalized.

In summary, failing to price in the environmental value of water leads to considerable undervaluation. It risks locking in ecological degradation of the Latrobe River and Gippsland Lakes by encouraging overuse. This approach is inconsistent with the precautionary principle and sustainable water management. An environmentally responsible pricing scheme would treat that 129 GL/year environmental deficit as a *real cost* – effectively, water in this system is scarce and environmentally precious. The next section examines an equally important omission in the Ricardo (2025) pricing: the cultural values and rights of Traditional Owners.

Exclusion of Cultural Water Rights and Values

Traditional Owners' Relationship with Latrobe River (Durt'yowan)

For the Gunaikurnai and other Traditional Owners of the region, water is far more than a commodity – it is *life*, identity, and law. The Latrobe (Durt'yowan) is an integral part of Gunaikurnai Country, which has been managed sustainably by its custodians for millennia (GLAWAC, 2015). The river and its tributaries hold profound cultural significance, containing the spiritual connections between the "Old People" (ancestors) and present and future generations. In practical terms, this means waterways are inseparable from Aboriginal identity and well-being; impacts on the river are felt as impacts on the people. Traditional Owner knowledge holds that water, land, people, flora and fauna are part of one living system, and water itself is a living entity with its own spirit and rights (GLAWAC, 2015).

This perspective is gaining broader legal recognition – for example, the Victorian Parliament in 2017 passed the Yarra River Protection Act, which for the first time in Australia recognized a river (Birrarung or Yarra) as *"one living and integrated natural entity"*, acknowledging that it is alive and has intrinsic value beyond its utility. As water law scholar Erin O'Donnell explains, *"the 'living entity' [concept] is a formal acknowledgement in law that the river and its lands are alive…so we stop treating them just as resources to be exploited" (O'Donnell & Marshall, 2024)*. In Indigenous terms, this simply affirms what Traditional Owners have always known – that water must be respected as kin, not taken for granted.

However, colonial water management in Victoria historically excluded Traditional Owners from water ownership and governance, leading to profound injustice. The Victorian Government's policy document *Water is Life: Traditional Owner Access to Water Roadmap* (DELWP, 2022) explicitly recognizes the *"historical injustice of*

Traditional Owners' exclusion from water ownership and management" and sets out to address it. This roadmap, developed in partnership with Traditional Owner groups, commits to increasing Traditional Owners' access to water for cultural and economic purposes and ensuring their voices guide water planning. For example, Water is Life (2022) outlines pathways for converting some existing water entitlements to Traditional Owner control and establishing cultural flows – water to meet the spiritual, cultural and social needs determined by Indigenous Nations themselves. It embodies a shift towards self-determination in water management, underpinned by Traditional Owner law and lore that views water with "respect and reciprocity" as a living part of Country.

Given this context, any decision about allocating Latrobe River water must consider what Traditional Owners stand to lose or gain. If a large volume of water is granted to mine operators, that means that water is not available to restore the river's health (which underpins cultural practices), or to be reallocated to Traditional Owners as justice measures. The opportunity cost to Traditional Owners is real: it could be the foregone chance to revive a wetland for cultural harvesting, to practice ceremony on a flowing river, or to develop enterprises (like aquaculture or bush foods irrigation) that rely on water. As Ricardo (2025) rightly points out, *"the benefits derived by Traditional Owners from access to water in the Latrobe River system…reflect a potential opportunity cost of allocating this water to mine rehabilitation"*. In other words, every megalitre diverted to a mine pit could have been a megalitre empowering Traditional Owner communities and Culture.

Cultural Values Left Unpriced

Despite acknowledging this dynamic qualitatively, the Ricardo review ultimately **left Traditional Owner water values out of the price calculation**. The report notes that the government is making efforts to return water to Traditional Owners for self-determined use (citing the Water is Life roadmap), and it even references the development of a "Cultural Benefits Framework" to help evaluate cultural outcomes of water allocations. These are positive acknowledgements. Yet, when determining the price range, the analysts again cited a lack of market data: *"there are no direct market prices"* for cultural water uses, so the opportunity cost of water for Traditional Owners was not included. In plain terms, the analysis treated the cultural value of water as zero. This is as flawed as ignoring environmental value. It effectively perpetuates the very injustice that Water is Life aims to fix – by sidelining Traditional Owner interests in favour of commercial use. As Environment Victoria put it, *"water should be priced to reflect what society forgoes by giving water to mine rehab instead of other uses (e.g. restoring nature or water for Traditional Owners). Setting the price too low undervalues water and burdens the public"* (Environment Victoria, 2025). Under-pricing the cultural component means society is not just forgoing abstract "Traditional Owner outcomes," but missing a chance to invest in First Nations justice and community resilience.

It is important to stress that many cultural values of water are not easily translated to dollars – and indeed Traditional Owners often oppose reducing their spiritual connection to a commodity value. Ricardo (2025) correctly notes that *monetising cultural benefits is challenging and not typically appropriate*. However, the solution to that challenge is **not to assign a zero value**, but rather to apply a precautionary or proxy valuation approach that ensures cultural water needs are given weight in decision-making. For instance, the value could be represented by the cost of initiatives to secure cultural water elsewhere, or by considering willingness-to-accept compensation (if such a concept were appropriate). At minimum, one could argue for placing the price at the higher end of the possible range to account for intangible values. The report hints that including Traditional Owner value would broaden the opportunity cost range beyond the irrigation benchmark – implying the true upper bound is higher than $260/ML – but then defaults to ignoring that insight. This is a significant failing in the analysis.

Beyond numeric pricing, failing to account for **cultural water rights** raises both legal and ethical concerns. The *Victorian Water Act 1989* was amended following the *National Water Initiative (2004)* to recognise the needs of Traditional Owners and to ensure their inclusion in water planning processes. While the Act does not yet allocate water entitlements to Indigenous groups by default, recent policy developments—such as the *Traditional Owner Settlement Act 2010* and successive water strategies—clearly commit to providing water or equivalent licences to Traditional Owners as part of broader self-determination goals.

Recent progress underscores this shift. In 2023, Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) received a two-gigalitre entitlement on the Mitchell River, and in early 2024, the Minister for Water announced that GLaWAC had secured a one-third share of the ¾ bench in the Gippsland region, with a formal media release recognising the significance of this milestone. These advances reflect the growing legal and moral recognition that Traditional Owners are not just stakeholders, but sovereign rights-holders in water management.

Misleading Framing of Net Water Gains for the Environment and Traditional Owners

It's important to carefully scrutinise the Minister's recent statement about water allocations in the Latrobe system—particularly the reference to the ¾ bench allocation and the share provided to GLaWAC. While GLaWAC and the environment now receive a combined 10.5 GL per annum, this must be understood in the context of significant losses in surface return flows from power stations, which have historically totalled over 23 GL per year (not including Hazelwood). These return flows—comprising rainwater runoff, stormwater, pumped groundwater (dewatering), and recycled cooling water—have provided incidental environmental and consumptive benefits over many decades.

As noted in the *Alluvium Technical Report* (pp. 12–13), these flows are not upstream environmental releases but by-products of industrial operations that, once returned to the system, augmented downstream availability. However, **these benefits have no legal protection**—under existing arrangements, generators could legally curtail or redirect them without breaching entitlement conditions. Presenting the new entitlements to GLaWAC and the environment without acknowledging this net loss of return flows is misleading and risks overstating the actual water available for ecological and cultural purposes. The shift from return flows to direct extraction must be viewed through a loss–gain lens, not as a net gain in access.

Pricing decisions that exclude or undervalue cultural water reinforce historical dispossession and risk undermining Victoria's own commitments to justice, treaty, and reconciliation. Any fair and future-focused pricing framework must integrate **First Peoples' water values and entitlements**, not treat them as incidental or secondary considerations. The Minister for Water, in considering a new entitlement, must consider "the needs of other potential applicants" – arguably this includes Traditional Owner groups who might apply for water for cultural use. If a large volume is given to mines at a nominal price, it could preclude future allocations to Traditional Owners (since the resource pool would be diminished) or set a precedent of cheap sale of water that undermines the value of Aboriginal water holdings. It is notable that the consultation on these entitlements arose after community and Traditional Owner advocacy; the Minister is legally required to consider submissions on the issue, reflecting the importance of these voices in the process. Ethically, failing to incorporate cultural water value is a **form of systemic bias** – the models readily quantify agricultural dollars but not Indigenous benefits, thus reproducing power imbalances in resource governance.

Living Entity and Rights-based Perspectives

From a rights-of-nature standpoint, acknowledging waterways as living entities (as in the Yarra Act and in New Zealand's Whanganui River settlement) bolsters the argument that water has its own intrinsic rights which should be considered in resource allocation. If the Latrobe River were represented by a legal guardian, how would they price the water taken from the river's "body"? Likely, they would demand compensation commensurate with the loss to the river's health, or even argue that some extractions should not occur at all if they irreversibly harm the river. While Victoria has not (yet) granted the Latrobe such legal status, the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC), as the Traditional Owner entity, could be seen as a proxy guardian for the river's interests. Their perspective would emphasize that water left in-stream is "invested" in the river's life for future generations – a value not captured by short-term market prices. Internationally, at least 30 countries have adopted Rights of

Nature provisions, and rivers in countries like Aotearoa NZ, India, and Colombia have been recognized as legal persons or rights-bearing entities. These trends underscore a growing recognition that cultural and spiritual values of water must inform governance. The exclusion of such values in the Ricardo pricing framework reveals a dated approach, out of step with contemporary water justice principles.

Exclusion of Urban Water Supply Opportunity Costs by Ricardo (2025)

Ricardo (2025) dismisses urban water supply pricing as a reference point for establishing the price of surface water entitlements for Latrobe Valley mine rehabilitation. The justification presented hinges on two primary assumptions: first, the perceived limited local demand for additional urban water supplies; and second, the logistical impracticality of transferring surface water from the Latrobe Valley to metropolitan areas such as Melbourne. While superficially reasonable, these assumptions are overly simplistic and narrow, and do not adequately reflect regional hydrological realities or the evolving context of water demand and resource management in Victoria.

Firstly, the claim of limited future urban demand is questionable in light of ongoing regional population growth, increasing urbanisation pressures, and the projected impacts of climate change. These factors combined are likely to significantly elevate regional demand, placing greater value on local water resources. Failing to recognise these pressures risks undervaluing the true opportunity cost of diverting substantial volumes of water from environmental and urban applications to industrial use such as mine rehabilitation.

Secondly, Ricardo's dismissal of urban water supply opportunities due to logistical impracticalities reflects a static and incomplete view of Victoria's water infrastructure and management context. While the Thomson River is not part of the Latrobe system, it provides a relevant precedent: significant volumes are already diverted from its upper catchment to supply metropolitan Melbourne via the Thomson Dam. This underscores the broader strategic value of Gippsland's water resources to state-wide urban water security.

Moreover, the Ricardo report fails to consider the potential for federal–state co-investment, as routinely occurs for major infrastructure such as roads, freight corridors, and energy interconnectors. Given the escalating national challenge of water security, particularly under a drying climate, this consultation presents an opportunity to scope a premium public benefit through long-term cooperative planning. Federal support for water infrastructure—akin to the model used in the energy sector (e.g. Victoria's historical role as a net exporter of electricity to NSW via the VNI)—should not

be discounted. Overlooking this possibility reflects a short-term view and risks missing a once-in-a-generation opportunity to align mine rehabilitation with broader public good outcomes. By ignoring these dimensions, the Ricardo report offers an incomplete and overly constrained assessment of feasible alternatives and opportunity costs.

Furthermore, future water security scenarios—particularly under climate change—may necessitate renewed infrastructure investments in manufactured water (desalination) to maintain urban water supply resilience. Melbourne's dependence on the Thomson catchment and more recently the Melbourne Desalinisation Plant near Wonthaggi illustrates the potential for similar initiatives. By overlooking this precedent and potential, Ricardo's approach constrains opportunity-cost considerations, failing to fully acknowledge the broader regional implications of large-scale water allocations to mine rehabilitation.

Therefore, a more comprehensive and strategic approach would explicitly consider urban water supply values as a reference point for pricing Latrobe River surface water entitlements. Such an approach would better capture the potential long-term value and strategic significance of this resource, ensuring water allocations appropriately reflect future uncertainties, infrastructure possibilities, regional population growth, and climate resilience objectives.

Policy Consideration: Per-Megalitre Benchmarking of Ecosystem Services

Converting the ecosystem services provided by environmental water into a per-megalitre (ML) benchmark offers a pragmatic tool for informing water pricing decisions in the Latrobe River system. This approach aligns with the principles of the **Central and Gippsland Region Sustainable Water Strategy (CGRSWS)**, which emphasises the need to account for environmental and cultural water values in allocation frameworks (Victorian Government, 2022).

By relating the estimated annual environmental water deficit of 129,000 ML to ecosystem service values (e.g., carbon sequestration, habitat provision, shoreline stabilisation), policymakers can begin to internalise environmental opportunity costs within water pricing mechanisms. Such benchmarks can guide decision-making around consumptive uses, including mine rehabilitation, and incentivise alternative water sourcing strategies.

However, caution is warranted. Ecosystem responses to flow are often non-linear, with critical thresholds and timing influencing ecological outcomes (Young & McColl, 2009). Applying a flat per-ML price risks oversimplifying these dynamics and underrepresenting place-based cultural and ecological complexities. Therefore, per-ML

ecosystem service values should be treated as indicative and supplemented with ecological flow modelling, cultural water assessments, and scenario planning. This layered approach will ensure water pricing better reflects the true societal and ecological costs of reallocation.

Implications of Undervaluation and Distorted Decision-Making

Because the Ricardo report's "efficient pricing band" failed to internalize environmental and cultural costs, its recommendation can be seen as economically and socially suboptimal. Water pricing that ignores huge externalities is not truly "efficient" in the broader sense of maximizing societal welfare – it may appear efficient to a narrow market view, but in reality it shifts costs onto the environment and Indigenous communities. This undervaluation has several tangible implications:

- Overuse of Water and Environmental Degradation: A low price makes it economically rational for mine operators to use as much river water as allowed, potentially drawing down the system at times when that water is critically needed for baseflows and wetland connectivity. The result could be more frequent shortfalls in meeting environmental flow targets, further loss of wetlands (e.g. overall extent and condition of remaining freshwater refuge areas like Sale Common could be reduced), and harm to species such as the endangered Australasian Bittern and other the migratory bird species which depend on the lake system. This would contradict the Victorian Environmental Water Holder's objective of improving the Latrobe's health and violate community expectations for river restoration.
- Entrenching Climate Vulnerability: The Latrobe catchment is projected to get drier with climate change (annual water availability could decline sharply by 2050). Allocating water to non-essential uses now, at low cost, leaves less flexibility in future droughts. If environmental or cultural flows need to be increased later (to fulfill CGRSWS or legal requirements), it might be much more expensive to recover water from entitlements granted cheaply to mines. Essentially, undervaluing now can create a *legacy of over-allocation* that is costly or politically difficult to undo, similar to issues seen in the Murray-Darling Basin.
- Public Financial Loss and Missed Investment: By not capturing the full value of the water, the State stands to receive minimal payment from mine operators (who are benefiting from a public resource). As Environment Victoria argued, this *"burdens the public"*, because taxpayers and communities

effectively subsidize the transaction. Conversely, if a higher, more appropriate price were charged, the revenue could be significant and could be earmarked for public benefits. For example, *funds could go into programs that protect and restore rivers – purchasing and rewatering floodplain wetlands, recreating lost meanders, installing fish ladders – or towards Traditional Owner water projects*. In fact, we strongly recommend a special investment fund be set up for this, rather than the fees going into general State revenue. These investments would offset some of the environmental opportunity costs. Under-pricing forfeits that opportunity, amounting to lost public value.

- Undermining Traditional Owner Trust and Reconciliation: A process that effectively gives water away for "next to nothing" to mining companies while Traditional Owners still lack water rights is perceived as a continuation of colonial-era inequities. It can erode trust in government commitments like Water is Life, unless corrective measures are taken. Notably, the consultation itself (on whether and how to charge) was driven by community and First Nations' advocacy. A pricing outcome that ignores those voices would damage relationships and Victorian goals for self-determination. On the other hand, setting a culturally informed price (and using part of the proceeds to support Aboriginal water access or cultural heritage along the river) would signal good faith and respect for Country.

In light of these points, it becomes clear that **excluding environmental and cultural values has skewed the Ricardo report's results.** The *efficient pricing band* recommended is set far too low, meaning it does not reflect the true *"full ecological and cultural opportunity costs"* of using Latrobe River water for mine rehabilitation. The next section outlines recommendations to correct this and move toward a more holistic and just pricing approach.

Strategic Regulatory Safeguards

Alongside progressive pricing, conditions on water entitlements must remain strict, in accordance with DELWP technical study recommendations (DELWP, 2020). Extraction rules should mandate, as a minimum:

- **Seasonal restrictions** to ensure extraction occurs only during wet periods, minimizing stress during droughts.
- **Flow triggers** that halt extraction entirely if environmental thresholds (such as baseflow needs, nutrient levels, salinity and other pollutant thresholds, or biodiversity indicators) are not met.

These safeguards ensure environmental protection remains paramount, even if pricing is set lower than the full opportunity cost price initially. It ensures a precautionary

environmental approach is enforced by regulatory conditions, preventing the mines from over-extracting due to relatively affordable initial pricing.

In sum, these regulatory safeguards act as a critical safety net and help avoid the risk of irreversible ecological harm by ensuring water extraction for mine rehabilitation is tightly controlled and responsive to environmental conditions. By embedding flow-based triggers, seasonal restrictions, and ecosystem health thresholds into entitlement conditions, regulators can prevent overuse during dry periods or times of ecological stress. This not only upholds the precautionary principle but also reinforces legal obligations under the Environment Protection Act 2017 (Vic) General Environmental Duty, which requires all parties to minimise harm through proactive risk management. Crucially, these safeguards ensure that pricing mechanisms do not operate in isolation but are integrated with adaptive management tools that respond to real-world hydrological and ecological changes. In doing so, they provide a backstop against the inherent uncertainties of climate change and avoid placing additional pressure on already flow-stressed rivers and internationally significant wetlands.

Recommendations

1. Undertake a Comprehensive Study of Non-Market Water Values in Gippsland

The current lack of regional data on non-market values for water represents a critical knowledge gap. To address this, the Victorian Government should commission a comprehensive, region-specific study into the non-market values of water in the Gippsland region, with a particular emphasis on the Gippsland Lakes Ramsar site. Such a study should:

- Quantify the ecological, cultural, recreational, and intrinsic values of water within the Gippsland Lakes and associated waterways, using established non-market valuation methodologies such as contingent valuation, choice modelling, ecosystem service valuation, and benefit transfer approaches.
- Explicitly include Traditional Owner input, ensuring cultural values and perspectives are accurately represented and incorporated into valuation processes. This should be co-designed with the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) and other relevant Traditional Owner entities.
- Integrate climate change scenarios to evaluate how changing water availability and increased flow stress could alter the non-market values of water over time, further strengthening the robustness and applicability of valuation outcomes.

- Inform future water pricing and policy decisions, particularly the allocation of significant volumes of water for activities such as mine rehabilitation or agricultural development, ensuring these decisions fully reflect the community's broader environmental and cultural interests.

This study would directly respond to the concerns highlighted by Ricardo (2025) regarding the absence of localised valuation data and would provide the empirical basis necessary for future pricing frameworks. By clearly establishing the community, environmental, and cultural importance of water, decision-makers would be better positioned to internalise these values in water pricing and allocation, resulting in more orderly, equitable and sustainable outcomes for Gippsland's waterways, communities, and Traditional Owners.

2. Integrate Environmental, Restoration and Water Recovery Opportunity Cost into Water Pricing

The price of surface and river water used for purposes of mine rehabilitation should be adjusted upward to reflect its true ecological and urban water supply value. In practical terms, this means using the upper end of any estimated range and adding a premium for environmental externalities and the opportunity cost of urban water supply. Given the evidence of a **129 GL/yr environmental flow deficit**, a strong case exists to include an *environmental scarcity premium* informed by the non-market water value study recommended above. In the absence of such a study, pricing could initially incorporate the cost of obtaining or saving an equivalent amount of water for the environment. If recovering water via off-stream projects or efficiency measures costs, say, $900–$1400/ML (a conservative estimate in light of alternatives like recycled or manufactured water estimated at $3000/ML), that should be added to the base price.

Similarly, an additional premium reflecting ecological restoration costs for the Latrobe river system could also be included. Preliminary estimates by the West Gippsland Catchment Management Authority (WGCMA) suggest ecological restoration works required to rehabilitate the Latrobe River and associated ecosystems could total approximately $250–$300 million over a 40-year timeframe. Translating this into an indicative per-megalitre premium ($48-58 per ML) provides a concrete basis for the environmental restoration opportunity cost, significantly raising the recommended water price above Ricardo's initial upper bound. Additionally, given the damage was largely caused by diverting water to energy generators at a very cheap price in the first place, it seems fitting that the waterways restoration is contributed to largely by those same companies. Therefore, a fairer and more comprehensive price range would consider the opportunity costs associated with different uses of surface water, as outlined below:

Opportunity Cost of Water	Price range (A$ per ML)
Ecosystem services (preliminary estimate)	$1644–1654 /ML
Ecological restoration costs (West Gippsland CMA costings)	$48-$58/ML
Agriculture / irrigation (Ricardo estimate)	$200-260/ML
Cultural water licenses (to be determined with Traditional Owners)	$ TBD
Estimated Partial Opportunity Cost	**$1892-$1972/ML**

The above approach ensures the opportunity cost of foregone environmental water, water recovery/efficiency projects, river restoration and cultural water licenses (once determined) is internalized. As a result, the price far exceeds the initial agricultural water price estimate of $260/ML. Importantly, the estimated first-order price range of $1892-$1972/ML excludes cultural water licenses that must involve Traditional Owner's direct input. While precise quantification can be challenging, the principle is to **err on the side of overestimating** environmental, cultural and alternate economic value of water rather than underestimating. This not only better reflects true societal costs but also provides a disincentive to overuse. In line with the precautionary principle, when in doubt, value the water more highly to safeguard the river's health. In lieu of the limited opportunity cost data currently available for the region, **we urge adopting the cost of desalinated water ($3,000/ML) as a benchmark** in calculating opportunity costs, acknowledging parallels with the Moorabool system. This price can be adjusted once the recommended 'non-market value' studies and cultural water negotiations are completed.

3. Integrate Cultural Water Value and Prioritize Traditional Owner Needs

It is recommended that any pricing framework explicitly recognize a cultural water component. One way to do this is to reserve a proportion of the water (or the water's value) for Traditional Owner benefit. For example, for every megalitre allocated to mines, a certain volume could be *set aside as a new environmental or cultural entitlement* held by Traditional Owners or the environmental water holder. Alternatively, an additional fee (a "cultural heritage water levy") per ML could be charged, with the proceeds placed into a Traditional Owner Water Fund. This fund, co-managed with First Nations authorities, could purchase water for cultural uses, invest in cultural flow assessments, or support projects that strengthen Traditional Owners' connection to water (such as revegetating significant riparian sites or enabling cultural ceremonies on Country).

This effectively builds the cultural opportunity cost into the price – the higher price directly funds the outcomes that would otherwise be forgone. Importantly, Traditional Owners should be co-designers of such mechanisms. Following the *Water is Life*

roadmap's guidance, their self-determined objectives (be it spiritual renewal, economic development, or healing Country) should drive how cultural water is accounted for. Symbolically, this also acknowledges that water has a sacred value. Even if that cannot be reduced to a dollar amount, the act of including a cultural dimension in pricing is a step toward remedying historical exclusion. It aligns with Article 25 of the UN Declaration on the Rights of Indigenous Peoples, which affirms Indigenous peoples' rights to maintain and strengthen their spiritual relationship with water.

4. Use Pricing to Encourage Sustainable Alternatives

The Government should recognize pricing as a tool to influence behaviour in favor of sustainability. A higher water price (closer to its true value) can incentivize mine licensees to seriously investigate alternative water sources or methods that reduce reliance on the Latrobe. As noted, prior studies dismissed options like recycled water due to comparing against an unrealistically cheap river water price. If the river water price is raised substantially, those options may become viable or even preferable. Therefore, the recommended policy is to set the water price at a level that makes alternatives part of the equation. This could be informed by the cost threshold at which, for example, using desalinated water or treated wastewater from Gippsland Water's plants, or capturing local stormwater, would cost the same as river water.

Phrased differently, price the river water not to be the cheapest option but to reflect its premium value as an **irreplaceable and increasingly scarce resource.** If this results in mine operators opting for a different water source, the river and wetlands benefit directly (and that is arguably the best outcome). If they still choose to take river water and pay the high price this not ideal–but at least the community accrues funds that can partly mitigate the impacts. This is consistent with economic principles of efficient resource allocation: the price signal ensures water is only used for mine rehab if it is truly the highest-value use and users are willing to compensate for the full loss to others.

5. Earmark Revenue for Environmental and Cultural Rehabilitation

It is strongly recommended that any revenue from mine water charges be transparently reinvested into the Latrobe River system and its people. Rather than disappearing into general treasury, a financial mechanism should be set up whereby these funds are isolated and invested to support:

(a) Environmental projects – principally funding environmental flows, then purchasing and protecting ecologically important floodplain lands, or habitat works in the Latrobe

and Gippsland Lakes (such as wetland restoration, fish passage improvements, replanting riverbanks to improve water quality).

(b) Traditional Owner initiatives – e.g. contributions to implementing the Water is Life roadmap, such as assisting a Traditional Owner Nation to acquire its own water entitlement or develop on-Country water infrastructure, and supporting joint management of waterways. By tying the price to such outcomes, the policy aligns with the principle that *those who benefit from resource use should compensate for the loss of public/environmental benefits*. Over time, this could even be structured as a trust fund for the Latrobe River as a living entity, echoing the guardianship models seen in the Yarra River Protection Act (where a Birrarung Council advises on river health priorities). This approach converts the potential negative of water extraction into a direct positive for the river and Traditional Owners, effectively balancing the scales. It would also build broader public support for the pricing scheme, as locals see tangible benefits like improved wetland condition or cultural sites being protected.

6. Align Pricing Decisions with Legal and Policy Obligations

Any final pricing determination by the Minister should be accompanied by a statement demonstrating how it complies with Section 40 of the Water Act 1989 (consideration of environmental protection and other users) and advances the objectives of the CGRSWS (2022) and related strategies. This means the pricing should be high enough (or structured in such a way) that it does not undermine the goal of returning water to the environment, nor the commitments to Traditional Owners. For example, if CGRSWS aims to recover 10 GL p.a. for the Latrobe system, the volume allocated to mines might be capped or phased such that it never reduces the progress toward that target – and pricing can help enforce that by, say, escalating sharply if environmental flow indicators drop.

Additionally, **environmental contingency triggers** should be built into the water entitlement conditions: during dry periods or ecological stress, water for mine rehab might be curtailed unless the operator purchases equivalent water on the market to compensate. While these are allocation rules, they interact with pricing (since reduced reliability would effectively raise the unit cost of water to the miner, reflecting scarcity). All such measures ensure pricing does not operate in a policy vacuum but is a tool integrated into sustainable water governance. The pricing mechanism should be reviewed periodically (e.g. every 5 years) against environmental outcomes and cultural milestones – if the river's health is still declining or Traditional Owner aspirations unmet, the price or conditions should be adjusted upward. This dynamic approach echoes the recommendation in Ricardo (2025) that pricing needs flexibility to adjust as water value changes over time, but here the *values that may change* include ecological degradation or improvements and social expectations of justice.

7. Recognize Water as a Living Entity in Decision-Making

While not yet formal state policy for the Latrobe, the "living entity" concept should guide the mindset of regulators setting the price. In practical terms, this could mean conducting a values assessment that gives the Latrobe River a figurative "voice" in the process. For example, include in the pricing report a section that answers: *What would the river say about this allocation and price?* Such an exercise, informed by Traditional Owner input and ecological science, could justify a higher price by articulating the **waterways' intrinsic worth**.

International best practice, like the Whanganui River settlement, involved financial redress and a fund to support the river's well-being in acknowledgement of past harms. Taking a cue from that, the Latrobe's living value can be partially recognized through a robust pricing + investment regime that treats the river as a stakeholder. Although this is a less concrete "recommendation," it underlies all the above: moving beyond seeing water as just an economic input toward an ethic of custodianship. This shift in perspective, once embedded, will naturally lead to decisions (including higher prices or stricter conditions) that favour long-term river health and cultural respect. It is consistent with the emerging global norm of Rights of Nature, and positions Victoria as a leader in innovative, ethical water governance.

Conclusion

The Ricardo (2025) review on pricing Latrobe Valley mine rehabilitation water entitlements provided a starting point for discussion, but its exclusion of environmental and cultural values represents a significant analytical gap. This critique has illustrated how that gap, if not remedied, could lead to water being undervalued and allocated in ways that exacerbate ecological decline and perpetuate historical injustices. The Latrobe River system is already over-stretched, with a documented 129 GL annual shortfall to meet environmental needs and internationally significant wetlands at risk. It is also a river at the heart of Gunaikurnai Country, where water's value is woven into the fabric of culture and identity, defying simple monetization. Effective and equitable water pricing must acknowledge these realities.

Water that keeps a wetland or river alive or a culture alive, is worth far more than water that grows pasture or fills a toxic mining pit.

Excluding environmental and cultural opportunity costs from the efficient pricing band is not just a technical omission – it is ignorance of the very factors that matter most for a sustainable and just outcome. Simply put: The recommendations outlined – from

raising the price to directing revenue to restoration and respecting Traditional Owners' water rights – are practical steps to align the pricing mechanism with this understanding. Implementing them will help ensure that the inevitable costs of coal mine rehabilitation are *not offloaded onto the rivers and people of Gippsland*. Instead, those costs will be internalized by the mine operators, creating incentives to minimize water use and providing resources to repair any harm caused. This approach transforms pricing from a narrow economic exercise into a lever for positive change: improving river health, honouring cultural connections, and upholding the public interest.

In conclusion, the "efficient" price for Latrobe Valley mine water must be one that reflects **the *true* value of water – a value that encompasses ecosystem integrity, cultural survival, and the rights of future generations**. By adopting a higher price point that can account for full ecological and cultural opportunity costs, Victoria can turn the mine rehabilitation challenge into an opportunity to advance water justice and environmental sustainability. The Latrobe River, as a living entity, deserves nothing less.

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