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RLCAG SUBMISSION TO THE 2026 BASIN PLAN REVIEW

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APPENDICES

PART A – ISSUES OF CONCERN

INTRODUCTION:

The River, Lakes and Coorong Action Group Inc. was formed in 2006 as a direct response to the threats to a healthy ecosystem posed by the Millenium drought, overallocation and insufficient flow in the Murray Darling system. Since that time, we have continuously advocated for a healthy whole of Murray Darling basin sustainable system, from source to sea, with fair and equitable use of water for all including agriculture, First nations and the environment.

The objects and purposes of our association are:

- To protect, conserve and enhance the biodiversity of the River Murray, Lakes and Coorong.
- To liaise with appropriate bodies over the management of the River Murray, Lakes Alexandrina and Albert and the Coorong and their immediate surrounds.
- To educate the local community in River Ecology and its sound management.
- Advocate for First Nations water rights in the MD Basin.

RLCAG attempts to connect the dots between, what our Communities see and feel, what Country remembers, and what Science tells us. Our aim is to synthesize truthful information to reflect the whole Coorong, Lower Lakes and Murray Mouth (CLLMM) community.

We have engaged with Murray Darling matters through submissions, symposia, meetings and campaigns. Members of the organisation, in particular the late Henry Jones, were closely involved in the development of the Murray Darling Basin Plan. We acknowledge the benefits to the ecosystem since 2012 when the Basin Plan was enacted and the importance of environmental water. Without this E water, Lake Alexandrina would have been below sea level in 2016 during the Tinderbox Drought and there would not have been enough flow for fishways to function.

We also recognise the failure of the Basin Plan 2012 to achieve more than half of the Environmental Objectives set out in the Water Act 2007. There is not enough Environmental Water in the system, and that water cannot currently be delivered in a timely fashion to enhance fish breeding and watering of floodplains due to persisting constraints.

These failures have led to the official listed as a critically endangered ecological community under the EPBC Act on January 15, 2026 of the River Murray downstream of the Darling River and associated aquatic and floodplain systems. This listing provides the highest level of federal legal protection and extends from the junction of the Murray with the Darling downstream to include the Murray Mouth and Coorong.

We would like the MDB to be managed as follows:

- We would like to see the River managed as a sustainable “Living Entity” and not just a conduit for water delivery.
- We would also like to see more “bottom-up” management by fostering broader basin community engagement.
- Governance needs to include more transparent decision making and decisions need to be scientifically informed with the best available science.
- Compliance needs to be enforced.
- We would like to see water justice for First Nations people.
- Improved and facilitated communication between various interest groups along the river system to foster cooperation and dispel misinformation.

We would like to see decisive, immediate intervention to halt the ecological decline in the CLLMM area. This will improve the entire MDB system long term. If we under-resource this part of the system, we degrade everything upstream. A river dies from its mouth up.

RESPONSE TO ISSUES RAISED IN DISCUSSION PAPER:

1. An Initial Assessment of Sustainable Diversion Limit (SDL)

Discussion Paper Options:

1. The initial SDL assessments for surface water have identified 4 priority issues requiring action: river connectivity in the northern Basin, end-of-system outcomes, floodplain and wetland health, and native fish decline.
2. The initial SDL assessments for groundwater show more work is needed in 3 groundwater SDL units, to determine whether the SDL reflects an environmentally sustainable level of take. These are the Upper Namoi Alluvium, Lower Namoi Alluvium and the Lower Gwydir Alluvium.

A. "What do you think of the Issues and Options Presented?"

The Discussion Paper identifies eight (8) catchments where SDLs may not support Basin Plan environmental outcomes and reflect an ESLT. These are all major catchments in the Basin and reflect an over extraction throughout the Basin. This excessive extraction is leading to:

- Inadequate base and low flows,
- Adverse end of system outcomes,
- Poor wetland and floodplain condition,
- Declining native fish populations.

When looking back at the Guide to the Basin Plan, 2010, the analysis regarding how much water needed to be available to the environment to meet the environmental objectives of the Water Act was defined as being between 23,000 GL/yr and 26,000 GL/yr. Based on the extraction level at the time this rate equated to 3,900 GL/yr (assuming a return to wetter climatic conditions) to 6,900 GL/yr (high certainty of success, including under projected long term dryer climate change conditions) be returned to the environment. Unfortunately, even the agreed 2,750 GL plus 450 GL for the Southern Basin has not been delivered in full. Added to this the estimated level of water extractions occurring pre-2012 has since been increased. More water recovery is needed to maintain flows than previously thought. In addition to water recovered to date, a further 2,000 to 5,000 GL/ yr is required to deliver the flows that were deemed necessary to meet the objectives of the Water Act.

In addition, environmental water recovery is not likely to be on target as current practice does not account for return flows being reduced (through more efficient irrigation practices), increased utilisation of water entitlements, substitution of groundwater and climate change impacts. (Wheeler et al 2018).

The catchments identified by the Discussion Paper where SDLs are in question are all part of the lower MDB catchment. These are dependent on upstream flows and indicate that these upstream SDL's must also be over-allocated. Hence the Basin wide SDL is over-allocated and all SDL's need to be revised.

There needs to be recognition that the figure of 3,200 GL/yr for the environment is manifestly inadequate to maintain end of system wetland health, including keeping the mouth open. The MDBA must determine new, scientifically based environmentally sustainable level of takes (ESLT) and revised sustainable diversion limits (SDLs) for all catchments and have these implemented in all WRPs.

B. "Are there Other Issues and Options that should be Considered?"

The development of a more realistic, scientifically derived, Environmentally Sustainable Level of Take (ESLT) for the Basin and revised SDLs for all catchments must be the first step in achieving the desired outcomes of the Basin Plan.

We believe the Basin Plan Review must also address the following key issues:

Issue 1 – Delivery of Full 3,200 GL/yr of Environmental Water

Environment Water Entitlements have remained around 2,000 GL/yr for the past six years with a shortfall of over 750 GL/yr remaining to be reclaimed. Timeframes are not being enforced to recover Environment Water. Positive measure must be taken to recover Environmental Water that has been committed as delays and non-performing measures can be tolerated no longer.

The 450 GL/yr for the Southern Basin was legislated in the Basin Plan 2012, committed again in the 2023 Restoring our Rivers Bill. But only 221.2 GL/yr has been recovered thus far (DCCEEW March 2025 Update). The Discussion Papers assumes full recovery of the 450 GL, but when will it be recovered and what plan is in place if it's not?

Unspent funds committed to the 450 GL/yr Efficiency Measures must be redirected to voluntary buybacks as this is the proven best and most cost-effective way of acquiring Environmental Water.

The SDL Adjustment Mechanism (SDLAM) projects were to recover the equivalent of 675 GL/yr of Environmental Water but have not been delivered with some 300 GL/yr still outstanding and the volumes that have been credited to Environmental Water are unproven and highly questionable.

Accountability of SDLAM projects must be strengthened to ensure these projects deliver genuine ecological outcomes by:

- Testing completed SDLAM projects against outcome-based ecological criteria to determine whether they deliver benefits equivalent to water recovery.
- Revising the reconciliation process to assess actual ecological outcomes rather than relying primarily on modelled or assumed benefits.
- Withdrawing projects that do not demonstrate equivalent ecological outcomes and exclude them from contributing to Basin Plan targets, and
- Discontinuing new SDLAM projects and redirect unspent funds to the purchase of voluntary buybacks of Environmental Water.

Voluntary buybacks must be used to recover outstanding Environmental Waters as this is the cheapest and most effective way to recover Environmental Water

Actions:

- **All outstanding Efficiency Measures of the 450 GL/yr program and all SDLAM works still outstanding should be cancelled and the money used to buyback Environmental Water. This needs to be done urgently as the cost is only going to increase.**
- **The equivalent volumes of Environmental Water actually recovered by each of the 450 GL/yr Environmental Measures and SDLAM projects must be determined to ensure the total volumes proposed are actually recovered.**

Issue 2 – Re-evaluation of ESLT and Adjusting SDLs.

The Water Act 2007 and Basin Plan, in large part, draw their constitutional mandate from the implementation of the Ramsar Convention, the Convention on Biological Diversity and related international treaties. As the Basin Plan was enacted before Australia committed to the Convention on Biological Diversity's Kunming–Montreal Global Biodiversity Framework (GBF), the Basin Plan review provides a critical opportunity to align water reforms with the GBF to improve biodiversity outcomes while helping Australia meet its international obligations.

The GBF is a science-based, internationally agreed benchmark for reversing ecosystem decline. It allows for the prioritisation of effort to deliver the greatest ecological, cultural and social returns. It provides a practical approach to allocate limited water to where it can achieve greatest benefit for communities, ecosystems and regional economies.

GBF targets for the protection of at least 30 percent, and restoration of at least 30 percent, of freshwater ecosystems offer clear, defensible, outcomes-based, global benchmarks for prioritising wetlands of high biodiversity in a changing climate. Delivering these targets would also support

water quality, flood mitigation, productive biodiverse floodplains, tourism, local employment, cultural values and other ecosystems services.

Implementing the GBF targets will help protect wetlands that are most likely to persist under climate change. The revised Basin Plan should prioritise a representative suite of wetlands and rivers with high ecological, cultural and biodiversity values and the strongest likelihood of persistence under a hotter, drier climate.

These wetlands need to be identified and prioritised to achieve at least 30 percent protection and at least 30 percent restoration outcomes. The flow requirements required to sustain GBF outcomes need to be identified and embedded within the "Environmentally Sustainable Level of Take" (ESLT) and "Sustainable Diversion Limits" (SDLs) and sufficient Environmental Water needs to be secured and managed effectively to meet Basin Plan targets. Connectivity throughout the river system needs to be restored so that adequate flows can reach priority wetlands.

Environmental water recovery is currently not reflecting the ESLT required to maintain the environment even assuming a return to wetter conditions let alone a drying environment due to Climate Change.

Over allocation of water throughout the basin has always been the major issue and this will only be exacerbated by reduced flows due to Climate Change.

Actions:

- **The MDBA must review the environmentally sustainable level of takes (ESLT) based on the latest available scientific evidence to satisfy our National obligations, including the Global Biodiversity Framework, by using the best available models and determine and implemented revised sustainable diversion limits (SDLs).**
- **SDL's must be regularly adjusted (at least biannually) with % cuts to all extractive water entitlements to ensure that Environmental Waters receive their full entitlements and annual allocations are not degraded due to reduced River flows over time.**

Issue 3 – Restoration of Base Flows

End-of-system flows are essential for ecological survival. This is especially true for the Northern Basin which traditionally had large pools even in droughts but many of these pools were removed to aid navigation. In addition, floodplain harvesting has been identified in many reports as a significant contributing factor to the loss of base-flows. Ensuring floodplain harvesting is limited and ensuring that all rainfall runoff that is captured on farm is brought into the licensing regime are important steps for achieving base-flow connectivity.

Healthy wetlands require periodic watering at an appropriate frequency and duration, expressed as an 'environmental water requirement' (EWR). There are hundreds of EWRs for Basin ecosystems. They are linked to ecological outcomes such as the flows required for fish breeding or floodplain vegetation flowering.

Many EWRs are not being met, however, in part because they are not legally enforceable and critical flows required to meet EWRs are vulnerable to extraction.

Rather than trying to manage environmental outcomes for hundreds of EWRs, a better approach would be to identify a smaller subset of water requirements reflecting the essential watering needs of priority wetlands and enforce them as the highest priority in water sharing plans. Allocations and extractions should only be allowed if priority flow requirements to these wetlands have been achieved within the valley and in downstream connected valleys.

This will protect important flow events on a temporary basis, allowing them to pass through the system. This approach is adaptive and outcomes-focused, where upstream decisions are responsive to downstream conditions and outcomes in near real time. It allows for event-based water management which is increasingly important during crises (e.g. fish kills) and for managing impacts of climate change.

By agreeing on flow requirements in advance, it reduces uncertainty for water users who would otherwise face temporary discretionary restrictions during low flows. It is a transparent approach which gives greater public confidence in water management decisions.

Much work is already underway through the connectivity review in the northern Basin to prioritise important flow events within valleys and in downstream connected valleys. The 'resumption of flow' rule in the Darling-Baaka is one of many priority flow requirements already established.

These measures are increasingly recognised as essential to mitigate ecological risks and help sustain wetlands and rivers and support their ecosystem functions in a changing climate. Programs to accelerate the relaxation of constraints are crucial if we are to sustain floodplain wetlands and optimise the benefits of water for the environment held by government.

In the southern Basin and the Gwydir, flow constraints such as infrastructure and cropping on floodplains limit the ability of river operators to make environmental water releases, reducing opportunities for minor flooding of low-lying wetlands and increasing the risk of degradation of floodplain forests.

Floodplain engineering projects should be discontinued – they will not deliver the claimed benefits and they risk being maladaptive under climate change.

First flows are vital for ecosystems to restore life to rivers following drought. Protecting them from extraction is a critical element of restoring connectivity.

Actions:

- **Baseflows must be restored through implementing minimum daily flow rules at the end of each sub-catchment by:**
  - **Restricting floodplain harvesting and bringing all rainfall runoff that is captured on farm into the licensing regime.**
  - **Restrictions to supplementary take, and**
  - **Releasing water from dams where necessary to achieve end of system flows.**
  - **Extend flow rules for resumption of flow into the northern Basin tributaries to provide for a small flushing flow after extended dry periods all the way to Menindee Lakes prior to allowing extraction.**

Issue 4 – Protection of Ramsar Wetlands of International Significance

Ramsar listing requires that Australia maintain the ecological character in the 16 wetlands of international importance across the MD Basin. This was one of the Federal Government obligations which underscore the Water Act, 2007. These international treaty obligations include maintaining ecological character in these wetlands. Many of these sites are currently receiving insufficient water or need better managed flow regimes to sustain their condition and reverse ecological decline

Actions:

- **Evaluation of the Environmentally Sustainable Level of Take (ESLT) must ensure that the ecological character of all 16 Ramsar wetlands of international importance across the MDB are maintained.**

Issue 5 – Drought Measures

Connectivity of the River is essential for environmental health of the River. Water that reaches the CLLMM region and flows out the mouth of the River is not wasted water (as often contested by upstream irrigators) as communities and ecosystems along the River benefits from this water as it travels downstream and this water is doing an essential job of flushing salt and other pollutants from the entire Basin as well as maintaining the opening of the River mouth.

We are concerned about how to protect Environmental Water for the CLLMM region in the next drought. The CLLMM region is a major Ramsar wetland of international significance and as such must receive a very high priority during any drought event. There must be regulations put in place to ensure minimum flows, even in droughts, flow into the CLLMM region.

Actions:

- **The Ramsar wetlands of the CLLMM region must be assured of sufficient freshwater flows to maintain water levels in Lake Alexandrina of at least 0.4 m AHD at all times.**
- **A similar plan to that prepared for "Drought Operating Framework for Upper Murrumbidgee River" must be prepared for the CLLMM region as we do not want last minute decision made such as building a weir at Wellington.**

C. "What do you See as the Priorities?"

The highest priority and most urgent action is to recover all the Environmental Water committed. This should be achieved by voluntary buyback by the Federal Government.

Equally as important but may take longer to achieve, is to revise the environmentally sustainable level of takes (ESLT) based on the latest available scientific evidence using the best available models and determine and implemented revised sustainable diversion limits (SDLs).

Ensuring Base Flows in all sub-catchments throughout the Basin is essential for River Health. This Base Flow must also protected the CLLMM Region from severe droughts and ensure Lake Alexandrina water levels do not fall below 0.4m AHD. A river dies from its mouth and hence this is the area of highest priority.

2. Maximise the Benefit of Water for the Environment

Discussion Paper Options:

1. Reduce duplication and inefficiency in preparing annual environmental watering priorities and long-term watering plans.
2. Improve the Basin-wide environmental watering strategy to support strategic planning and transparent prioritisation of the environmental water portfolio.
3. Make adaptation explicit in environmental water planning. Require long-term watering plans to identify vulnerable environmental outcomes and transitioning ecosystems and improve knowledge sharing through the environmental watering plans.
4. Ensure environmental water is transparently accounted for and protected as it moves through the system.
5. Invest in coordinated and transparent environmental water delivery and outcomes reporting.
6. Strengthen First Nations peoples' involvement in planning, delivery and monitoring of water for the environment to deliver improved environment outcomes, and support Cultural, spiritual and community co-benefits.
7. Embed First Nations knowledge. Integrate First Nations knowledge into monitoring, evaluation and reporting processes.
8. Enable environmental water holders to prioritise environmental watering in areas where land and water management actions are coordinated, where appropriate.

A. "What do you think of the Issues and Options Presented?"

Improvements to efficiency in management as proposed in the Discussion Paper, while financially desirable, does not in itself improve outcomes for the Basin.

Maximising environmental benefits of water within the Murray–Darling Basin requires a strategic, science-led approach that prioritises ecological resilience, climate adaptation, First Nations engagement and long-term system health. Nowhere is this more critical than in South Australia's Lower Murray, including the Coorong, Lower Lakes and Murray Mouth (CLLMM) region.

South Australia sits at the downstream end of the Basin, meaning environmental outcomes depend on upstream water management. Delivering adequate, timely flows to the Lower Murray is essential.

In accordance with Basin Plan, 2012 and the Water Act, 2007 the parameters decided upon as indicators of enough water in the system to maintain end of system health were, amongst others, a salinity reading of less than 1,000 EC units at Milang on the shore of Lake Alexandrina and for the Murray Mouth to be kept open 90% of the time i.e. 9 yrs out of 10, by naturally occurring flow, without dredging.

Keeping the mouth open is important for the health of the entire system. 2 million tonnes of salt from upstream is expelled each year, along with nutrients. If not expelled, the salinity levels would increase all the way back upstream 250 Km. Nutrients exiting the Mouth are important in sustaining the Southeastern fisheries, including the rock lobster fishery. Diadromous fish need to travel between freshwater and saltwater environments to complete their life cycles. Congolli is an interesting example - moving out to the ocean to breed, then newly spawned juveniles return upstream to freshwater. Local extinction was a very real possibility during the Millenium Drought . Survival of these native fish has been helped by the introduction of fish ladders and water for the environment to keep fish ways open and allow flow through the barrages.

An open Murray Mouth is also critically important for the health of the Coorong, allowing flushing of hypersaline water.

This review needs to acknowledge the failure to support the Coorong, Lower Lakes and Murray Mouth region. The Plan has clearly failed when the Murray Mouth needs to be dredged on a 24-hourly basis most of the time, apart from a short period during the flood of 22/23 with dredging resuming after 13 months.

It is disturbing to read in the Discussion Paper that "It appears that flows alone will not be sufficient to keep the Murray Mouth open." And "the Authority will consider whether Basin Plan outcomes for the CLLMM need to be adjusted over the next 10 years."

B. "Are there Other Issues and Options that should be Considered?"

The River Lakes and Coorong Action Group provide the following information in support of reaching and then maintaining at least the agreed level of Environmental Water flow, if not more, specifically relating to the Lower Lakes and Coorong region.

Issue 1 – Volumes of Environmental Water are Important

Are we in danger (in South Australia) of ONLY preparing coping mechanisms to ensure the resilience of our water systems and communities?

MDBA have been focusing more on management of flows recently rather than fulfilling the committed volumes of Environment Water Entitlements.

Actions:

- **Full recovery of Environmental Water must be achieved urgently by using unspent funds from Efficiency Measures and SDLAM projects for voluntary buybacks of all 3,200 GL/yr of Environmental Water.**

Issue 2 - Enhancing Environmental Water Delivery for Ecological Outcomes

Environmental water must be managed to mimic more natural flow regimes, including variability in timing, magnitude, and duration. In the Lower Murray, this supports:

- Waterbird breeding in the Coorong's lagoon systems
- Recruitment of native fish species such as Murray cod and golden perch
- Healthy fringing vegetation like river red gums and lignum wetlands

Targeted watering actions—such as barrage releases into the Coorong—have shown measurable ecological benefits, including improved salinity gradients and increased food availability for migratory birds.

Actions:

- **Environmental water should be managed to mimic more natural flow regimes, including variability in timing, magnitude, and duration.**

Issue 3 – Need for Relaxation of Constraints

Environmental outcomes are not as good as predicted because of constraints which are preventing effective delivery to targets at higher elevations or through connecting watercourses. Many irrigators and floodplain farmers are actively resisting relaxing of constraints. A study of regional media demonstrated that negative comments on the Basin Plan outweighed positive reporting by more than 10:1. Success stories just do not get reported.

Conversely, reports by MDBA on environmental outcomes are selective, focussed on good news stories in environmental watering but are not reporting significant areas of wetlands and higher-level floodplains not receiving any water under current operating rules.

A key element of the Basin Plan, 2012 was the relaxation of physical and operational constraints to allow effective delivery of recovered water to improve the health of river ecosystems. However, persistent ongoing resistance to implementation of the original Basin Plan, and most especially to the constraints package, has limited effective delivery of recovered water and reduced the scale of positive outcomes. Constraints to environmental water delivery are identified as a key factor limiting the achievement of Basin-wide environmental watering strategy expected outcomes for flow, vegetation, fish and waterbirds.

The Constraints Roadmap (2024) was intended to break the deadlock, but instead it proposes extending the deadline for another 10 years. However, the environment is stressed now and cannot wait 10 years for the Constraints Roadmap to be completed.

Much work is already underway through the connectivity review in the northern Basin to prioritise important flow events within valleys and in downstream connected valleys. The 'resumption of flow' rule in the Darling-Baaka is one of many priority flow requirements already established. These measures are increasingly recognised as essential to mitigate ecological risks and help sustain wetlands and rivers and support their ecosystem functions in a changing climate.

Programs to accelerate the relaxation of constraints are crucial if we are to sustain floodplain wetlands and optimise the benefits of water for the environment held by government. In the southern Basin and the Gwydir, flow constraints such as infrastructure and cropping on floodplains limit the ability of river operators to make environmental water releases, reducing opportunities for minor flooding of low-lying wetlands and increasing the risk of degradation of floodplain forests. Floodplain engineering projects should be discontinued – they will not deliver the claimed benefits and they risk being maladaptive under climate change

Implementation of some trials to demonstrate to Basin communities that relaxing constraints could provide benefits throughout the tributary valleys and all the way to the end of the system. (see Appendix 4 – Lifeblood Alliance's "Breaking the Deadlock: A Two-Tier Proposal for Constraints Relaxation Demonstration")

As a first step, when flows of 25,000 ML/d or more occur naturally at the SA border, extra water could be released to boost flows up to 40,000 ML/d or more, allowing overbank flows onto floodplains. In the process of delivering the water to the Lower Murray Valley, benefits accrue to wetlands and floodplains along every tributary valley in the Southern Basin.

Then as a second step, once river flows reach 45,000 ML/d, booster flows could generate flows up to 60,000 ML/d in late spring, on average once every three years.

The major constraint is the need to agree between governments on changing the release rules to allow deliberate releases from storages for the creation of short, controlled, infrequent overbank flows. It is a matter for negotiation between the states to resolve this, no engineering works are required.

Actions:

- **Relaxation of Constraints must be implemented urgently to allow Environmental Water flows to be able to reach wetlands and floodplains.**
- **Some trials must be implemented to demonstrate to Basin communities that relaxing constraints could provide benefits throughout the tributary valleys and all the way to the end of the system.**

Issue 4 - Multiple Benefits from Environmental Water/River Health Water

Environmental water should be recognised not only for ecological outcomes but also for co-benefits, including:

- Supporting tourism and recreation in the Lower Lakes and Coorong,
- Enhancing water quality for local communities and Critical Human Needs, and
- Preserving culturally significant landscapes

Healthy ecosystems underpin regional economies and community wellbeing, particularly in South Australia where the Basin's end-of-system health is highly visible and socially significant. Environmental Water should be renamed as "River Health Maintenance Water".

Actions:

- **Environmental water must be recognised as not only providing ecological outcomes but also community and Cultural benefits and should be renamed as "River Health Maintenance Water".**

Issue 5 - Integrating Climate Change into Water Planning

Climate change is already reducing inflows across the Basin, particularly in southern regions. This has major implications for Environmental Water:

- Reduced runoff means less water available for both consumptive and environmental use
- Higher temperatures increase evaporation and ecological stress
- Extreme events (droughts and floods) are becoming more frequent and intense

To maximise environmental benefits under these conditions, the Basin Plan must:

- Incorporate climate-adjusted sustainable diversion limits (SDLs),
- Prioritise "no-regret" environmental watering actions,
- Increase flexibility in water management to respond to changing conditions and guarantee minimum Base Flows.

Actions:

- **Ensure critical water reserves in the Lower Murray are protected to maintain minimum Base Flows which protect ecological thresholds in prolonged dry periods.**

Issue 6 – Maximise Environmental Outcome by Collaborative Governance

We need to enshrine collaborative governance or deliberative democracy in the management of the MD Basin. This places conversation, diverse views, informed reflection and respectful listening at the heart of decision-making processes. Empirical research has shown that deliberative democracy reduces polarization, promotes considered judgement and counteracts populism. Deliberative democratic processes have been used around the world to amend constitutions in otherwise fractious political settings and to shift perspectives in relation to ideologically driven issues such as immigration and environmental management.

Regulatory reform should strengthen national oversight of water compliance, harmonise monitoring standards across Basin states, and ensure publicly accessible reporting of water extraction and environmental outcomes.

Strong, transparent regulation is essential to maintaining trust in the Murray–Darling Basin Plan and ensuring it delivers a healthy working river system. Without transparent compliance the strong shift needed in this space will not change.

Maximising environmental outcomes requires continuous improvement based on evidence. This includes:

- Long-term ecological monitoring in the Lower Murray and Coorong
- Adaptive management frameworks that adjust watering strategies based on outcomes
- Incorporation of First Nations knowledge, particularly from Ngarrindjeri people, whose cultural and ecological understanding of the Lower Lakes and Coorong is crucial.

Actions:

- **Collaborative governance must be adopted to improves both ecological outcomes and community trust in the Basin Plan.**

Issue 7 - Prioritising End-of-System Health

South Australia sits at the downstream end of the Basin, meaning environmental outcomes depend on upstream water management. Delivering adequate, timely flows to the Lower Murray is essential to:

- Maintain connectivity between freshwater, estuarine, and marine ecosystems
- Prevent acid sulfate soil exposure in lakes and wetlands
- Sustain salinity levels within ecological thresholds

For example, during the Millennium Drought, insufficient flows led to severe ecological degradation in Lake Alexandrina and Lake Albert, including acidification risks and habitat collapse. Recovery has demonstrated that restoring flows can reverse some of these impacts, but only when water is delivered at sufficient volumes and appropriate times.

Actions:

- **The end-of-system CLLMM region must be prioritised during low flows to ensure the environmental health of the whole Basin.**

Issue 8 - Supporting the Coorong's Ecological Recovery

The Coorong is a Ramsar-listed wetland of international importance, yet it remains highly vulnerable. Environmental water plays a key role in:

- Flushing salt from the system
- Supporting estuarine habitat diversity
- Preventing ecological regime shifts toward hyper salinity

Recent monitoring has shown that without sufficient freshwater inflows, the southern lagoon risks long-term ecological collapse. Strategic use of environmental water, combined with infrastructure like barrages, is essential for recovery.

A short-term emergency flow release to support system recovery of the Coorong South and North Lagoons should be trialled as this will also improve the water quality in the Great Southern Lakes and Lower Murray River?

It was noted that the Environmental Water received in SA was almost exclusively "Return Flow" from upstream use of Environmental Water and Environmental Water was not being specifically allocated for flushing the Coorong or improving the quality of water in the Lakes.

Actions:

- **The Ramsar wetlands of the Coorong must be maintained as a healthy ecosystem.**
- **Modelling and some flushing of the Coorong South Lagoon should be trialled?**

C. "What do you See as the Priorities?"

Maximising environmental benefits in the Murray–Darling Basin requires:

1. Prioritising downstream needs,
2. Ensuring minimum Base Flows and restoring more natural flow regimes, and
3. Embedding climate resilience into all aspects of water planning.

In South Australia's Lower Murray and Coorong, this is not only an environmental necessity but a national responsibility. Ensuring adequate and reliable environmental water is fundamental to achieving ecological recovery and safeguarding these internationally significant ecosystems for future generations.

3. Improve River Connectivity in the Northern Basin

Discussion Paper Options:

1. Include objectives and outcomes in the Basin Plan that specifically support end-of-system connectivity in the northern Basin.
2. Improve environmental water management, coordination and planning in the northern Basin.
3. NSW improves river connectivity across connected catchments of the northern Basin.

A. "What do you think of the Issues and Options Presented?"

Connectivity in the Northern Basin underpins ecological function, water quality, and cultural values, yet remains significantly compromised by current water management and infrastructure.

B. "Are there Other Issues and Options that should be Considered?"

Issues:
River connectivity in the Northern Basin is constrained by several interrelated factors:

- **Altered flow regimes**: Regulation and extraction have reduced natural flow variability and overbank events essential for ecosystem health.
- **Physical barriers**: Dams, weirs, and crossings restrict fish passage and disrupt sediment transport.
- **Floodplain disconnection**: Reduced inundation of wetlands has diminished ecological productivity and resilience.
- **Water extraction**: High diversion levels limit low and medium flows, weakening longitudinal connectivity.
- **Climate pressures**: Increased climate change variability further exacerbates system fragmentation.

Impacts:
These pressures have led to:

- Declines in native fish populations and biodiversity
- Reduced wetland function and waterbird breeding
- Poor water quality outcomes
- Significant impacts on First Nations cultural values

Actions:

- **Enhanced environmental flow management**
  Deliver flows that better reflect natural variability and support system-wide connectivity.
- **Barrier mitigation and fish passage**
  Upgrade or remove high-impact infrastructure to restore movement pathways.
- **Floodplain reconnection**
  Enable more frequent and managed inundation of key wetlands.
- **Water recovery and sustainable use**
  Reduce extraction pressure to maintain critical flow thresholds.
- **Integrated monitoring and knowledge sharing**
  Combine scientific data with Traditional Owner knowledge to guide management.

C. "What do you See as the Priorities?"

Improving connectivity in the Northern Basin is essential to achieving the environmental, social, and economic objectives of the Basin Plan. A coordinated and enforceable strategy is required to restore system function and ensure long-term resilience.

It is recommended that the Basin Plan Review adopt a Northern Basin Connectivity Strategy that includes:

- Clear, measurable connectivity targets
- A funded program for barrier removal and fishway installation

- Minimum flow commitments to maintain river continuity
- Targets for floodplain and wetland reconnection
- Formal inclusion of First Nations leadership and cultural water objectives
- An adaptive management framework with regular evaluation

4. Improve Floodplain and Wetland Health

Discussion Paper Options:

1. Continue the New South Wales's Murrumbidgee Reconnecting River Country program and extend the Gwydir Reconnecting Watercourse Country program beyond December 2026.
2. Take practical and incremental steps to increase environmental flows in priority areas for the Goulburn and Murray, developed in consultation with, and supported by, local communities and landholders.

A. "What do you think of the Issues and Options Presented?"

The authority proposes governments continue to relax constraints in Murrumbidgee and Gwydir. Priority areas for restoring floodplain and wetland health in this discussion paper are limited to the Lower Goulburn floodplain and the Mid-Murray floodplains and wetlands - from Yarrawonga to the South Australian border.

When wetlands are not being effectively watered, not only is there an immediate effect on the wetland itself, but a consequential effect felt downstream.

What is glaringly obviously omitted is any reference to South Australian wetlands and floodplains, including the SA designated Ramsar wetlands of international importance, recognised for their unique biodiversity, migratory bird habitats and ecological processes. The Coorong and Lakes Alexandrina and Albert, the Riverland Ramsar site and the Banrock Station wetland complex are noticeable by their absence.

We agree the health of the Basin depends on the river's ability to connect with its floodplains and wetlands. Connection is critical for flushing sediments and nutrients, maintaining and regeneration of native vegetation, breeding and migration of fish and birds and improving water quality.

B. "Are there Other Issues and Options that should be Considered?"

Healthy wetlands require periodic watering at an appropriate frequency and duration, expressed as an 'environmental water requirement' (EWR). There are hundreds of EWRs for Basin ecosystems. They are linked to ecological outcomes such as the flows required for fish breeding or floodplain vegetation flowering. Many EWRs are not being met, however, in part because they are not legally enforceable and critical flows required to meet EWRs are vulnerable to extraction.

Rather than trying to manage environmental outcomes for hundreds of EWRs, a better approach would be to identify a smaller subset of water requirements reflecting the essential watering needs of priority wetlands and enforce them as the highest priority in water sharing plans. Allocations and extractions should only be allowed if priority flow requirements to these wetlands have been achieved within the valley and in downstream connected valleys. This will protect important flow events on a temporary basis, allowing them to pass through the system.

We will concentrate our comments on the South Australian portion of the River Murray and Coorong, although it is vitally important to acknowledge the necessity of end-of-system flows from the Darling into the Murray. This water is vitally important for native fish breeding (higher temperature) but must not be a source of pollutants and black water events for those communities downstream.

Issue 1 – Insufficient Flows to Lower Murray Valley

The Basin Plan Evaluation confirms that only a small proportion of water for the environment reaches floodplains. This has led to a decline in vegetation and poor outcomes for native fish and water birds. This is highlighted by the River Murray downstream of the Darling River and associated aquatic and floodplain systems being official listed as a critically endangered ecological community under the EPBC Act on January 15, 2026. This listing provides the highest level of federal legal protection and extends from the junction of the Murray with the Darling downstream to include the Murray Mouth and Coorong. It is the first riverine ecosystem to be recognised as such rather than just a water source. Unfortunately, this section of the Murray has suffered severely from

over-extraction, drought, environmental neglect and constraints to the delivery of environmental water.

Floodplains in the Lower Murray Valley have been starved of water since the 1970s. The cumulative effect of over-extraction, dams and controlled water releases has deprived these floodplains of the relatively frequent small spring floods and curtailed medium floods.

In the Lower Murray, it takes a flow of at least 40,000 ML/day for water to spill out of the incised river channel and flow into creeks and wetlands, and eventually onto the floodplains.

Unless there is a natural spring flush or minor flood, flows into South Australia sit between only 3,000 ML/ day in winter and 7,000 ML/day in summer.

Preceding the Millenium Drought, the floodplains were already dry. By 2004 surveys by the Murray Darling Commission estimated 76% of red gums and 89% of black box were stressed, dead or dying along the 700 km of the Murray Valley. These trees had survived for 100s of years before over-extraction and river regulation.

The science-based target to sustain Lower Murray Floodplains is 80,000 ML/ day at the SA border, in late spring, once every 3 years. This cannot be achieved unless there is a natural river flow of 60,000ML/ day. (see Appendix 4 – Lifeblood Alliance's "Breaking the Deadlock: A Two Tier Proposal for Constraints Relaxation Demonstration")

Actions:

- **Implement the 2024 Constraints Relaxation Implementation Roadmap recommendation that higher environmental flows must be trialled and carried out in close partnership with communities and First Nations. As a first step, when increased flows are naturally occurring, CEWH water should be released to increase the flow to 35,000 ML/day, the minimum flow necessary to benefit the Lower Murray floodplains.**
- **As an initial step CEWH should immediately allow 15,000 ML/day through the Mid Murray- up from 9,000ML/d at present.**

Issue 2 – Impact of Climate Change on Lower Lakes

A wanton omission from Basin Plan, 2012 is not considering the impact climate change is having on the Murray Darling system and its wetlands. The impact of much lower inflows (up to 30 - 40% less), higher temperatures and increased evaporation must be taken into account when assessing the already threatened ecosystem. The need to prevent worsening of the already in-train climate change must be an integral part of preserving the ecosystem.

The state of the Ramsar listed wetland of international importance, Lakes Alexandrina and Albert, the Murray Mouth and the Coorong receive scant mention in this Basin Plan Review Discussion Paper. There is a valid argument that the end of system wetland is the most important of all the wetlands in the Basin.

Science confirms the reality that rivers die from the mouth up. It is happening in major river systems worldwide - e.g. the Colorado river in the U.S.A and the Mekong River in SE Asia.

We are in the unique position, being at the end of the Murray Darling system, to have experienced the devastating consequences of cease to flow events during the Millenium Drought. River Murray flows reached historically low levels, Lake Alexandrina and Lake Albert were no longer connected and previously submerged aquatic habitat was colonised by terrestrial species. Sulphate soils became toxically acidic and aquatic species in the estuarine habitats were unable to complete their life cycle. The impact of the Millenium Drought and over-allocation has had a long lasting impact, and there is evidence that some species have still not recovered from that event.

We have been concerned about the lack of recovery of the freshwater mussels (Lokeri). Pre-drought these mussels were in abundance, providing a valuable food source for the Ngarrindjeri Traditional

Owners. The Lokeri also have a vital role in the ecosystem as filter feeders and are excellent indicators of the environmental health of river systems.

Actions:

- **It is particularly important to have enough freshwater in the system at all times to maintain coverage of the extensive areas of acid sulphate soils in the wetlands of the Lower Murray and Lakes Alexandrina and Albert (0.4m AHD). The increased risk of this occurring due to Climate Change needs to be addressed now not in 2036.**

Issue 3 – Water Quality Issues due to Dry Wetlands

The entire area (approximately 580 sq kms, 1,900 GL) of Lake Alexandrina and the Murray channel to Goolwa , was affected by a toxic blue- green algae outbreak lasting for 5 months in 2024, recurring again in the autumn of 2025. This triggered a human Health Alert warning not to ingest and to avoid all contact with the water. The water was also unusable for stock. irrigation and recreational activities, causing significant economic losses to the region.

This toxic, tropical species of cylindrospermopsis raciborskii thrived in the conditions of low flow, high nutrient and increased temperature. Given these conditions are likely to persist and increase with climate change this is a dire warning about the health of this wetland. The possible link of the universally fatal Motor Neurone Disease in humans with higher exposure to Blue Green Algae is alarming. Water quality issues throughout the entire Basin need to be addressed, particularly the nutrient load, agricultural pollutants including fertilisers, pesticides and herbicides and forever chemicals e.g. PFAS.

Actions:

- **There needs to be enough water in the system for Minimum Base Flows in the river to flow and wetlands to be filled.**
- **Improved monitoring of water quality needs to be addressed urgently to identify sources of pollutants impacting ecosystems, and human health to reduce the risk of BGA blooms and other River health issues.**
- **It is important to adequately water upstream wetlands in an attempt to reduce nutrient load, by vegetation uptake, and reducing the amount of detritus which then washes out in floods causing Blackwater events.**

Issue 4 – Harmful Algal Bloom in SA Marine Waters around the Murray Mouth

Since April 2025, South Australia has experienced a disastrous marine algal bloom - initially identified as karenia mikimotoi, now with more toxic, karenia cristata identified. This algal bloom is still causing devastation to marine life along the southern coastline and the St Vincent and Spencer gulfs. This marine algal bloom also impacted the Coorong North Lagoon in Autumn 2025.

The cause of this bloom is multifactorial. High nutrient load exiting from the Murray Mouth during the 2022/2023 flood is cited as being a causative factor, a lack of the Bonney upwelling and a marine heatwave with sea temperatures 2.5 degrees above average.

Monitoring of water quality is imperative to identify what is coming down the river and out to sea. It may be that, along with nutrients, other agricultural pollutants including herbicides, pesticides and forever chemicals (e.g. PFAS) have together played a part in the development of this bloom.

Actions:

- **The Blue Green Algal outbreaks in the Lake and elsewhere upstream along the length of the Basin, as well as the 2025 and on-going HAB experienced in SA marine water highlight the need to monitor and reduce the level of nutrients and agricultural pollutants entering into the waterways at their source.**
- **Prevention is the only tool available to curb the increasing threat of algal blooms made more likely with a changed climate causing higher temperatures and lower flows.**

Issue 5 – Salinity of the Coorong Southern Lagoon

The Ramsar listed Coorong, particularly the Southern Lagoon, remains in a degraded state, despite decades of research and millions of dollars spent. Salinities can become 3 - 5 times seawater and the ecosystem no longer supports life. Mass fish kills are a regular occurrence but occur out of sight. Estimates of 200,000 to 500,000 fish killed in 2024 is evidence the ecosystem is under existential threat and deserves protection. This area is a Ramsar site of international importance and should be prioritised.

Current management does not appear to be enough to restore ecological function within the Coorong lagoons. Greater use of automatic barrage gates at Tauwitcherie, timed with high tides and wind direction could maximise the flush of necessary fresh water along the Coorong.

Most long-term fishermen of the Coorong claim that it is critical to fill the North Lagoon with freshwater immediately before the autumnal change of dominant wind direction (predominantly S/SE in summer becoming NW/W in winter). With an increase in marine tide levels at the Murray Mouth, this fresher water is shunted into the South Lagoon through Parnka Point.

Enough fresh water must be in the system to allow this. Historically freshwater flows, high in calcium carbonate, flowed from the South East into the Southern Lagoon, but are now minimal.

River Murray water flows through the barrages and SE flows must be maximised. The salinity in the Southern Lagoon needs to be kept below twice that of seawater (i.e. below 70g/L). The current salinity (1/4/26) at Woods Well is 102 g/L – i.e. 3 times the salinity of seawater. For the ecosystem to survive the calcium carbonate imbalance also needs to be fixed. It is important to remember the brief regeneration of seagrass meadows and fish in the Southern Lagoon in response to the 2022/2023 flood when fresh water flowed into the Coorong. Unfortunately, this was short-lived.

Action:

- **Greater use of automatic barrage gates at Tauwitcherie, timed with high tides and wind direction could maximise the flush of necessary fresh water along the Coorong.**
- **River Murray water flows through the barrages and SE flows must be maximised.**

Issue 6 – Maintaining freshwater in Lakes Alexandrina and Albert.

In the last 12 months we have seen the 4 largest over-topping events ever recorded at the Barrages. Saline water incursion has extended upstream from Goolwa. Measurements of salinity at Clayton Bay recorded at 5,000 EC following the overtopping.

Basin Plan, 2012 stipulates a salinity level in Lake Alexandrina of below 1,000 EC at Milang.

With climate change it becomes even more important to maintain the freshwater values of the lakes. This water is an important source of irrigation water for agriculture around Langhorne Creek. Increasing temperatures in parts of the Southern Basin will make some current irrigated agricultural areas unviable. We have already experienced 3 days of temperatures over 47 degrees this summer at Renmark. With fertile soil, access to freshwater and lower ambient temperatures the Lakes area will be a necessary part of adaptation to climate change for food security.

Action:

- **The question of maintaining the 80+ year old barrages and making them fit for purpose in the face of sea-level rise with raising of the height and increased automation to better serve the needs of the Coorong must be addressed.**
- **With regard to the problem of acid sulphate soils seen during the Millenium Drought, science has shown they need to be covered with fresh water, not salt water (Prof Rob Fitzpatrick). Saltwater coverage makes the problem worse.**

Issue 7 – Control of European Carp

We are alarmed at the potential harm to the river and wetlands, including the CLLMM area, of releasing the Carp virus. While acknowledging the problem this pest species is causing we are mindful of the “first do no harm principle”. If the biomass of fish in the basin is, as claimed, 90%

carp, a mass fish kill produced by the virus will be disastrous. Blackwater events, loss of native species through low dissolved oxygen levels, putrid rotting fish both in the river and on bank, increased cost of water treatment for potable water are just a few easily identifiable problems without addressing the risk of infecting other fish species or mutation of the virus.

Action:

- **We advocate for a widespread trial of conventional methods to remove carp from the system.**

C. "What do you See as the Priorities?"

Wetland health is integral to a sustainable Murray Darling basin system, even more so with the need for ecosystem resilience and adaptability in the face of a rapidly changing climate. Adequate amounts of good quality water must be available. Delivery needs to occur in a timely fashion to support all wetlands, including those of the Coorong, Lakes Alexandrina and Albert. Constraints to delivery need to be relaxed urgently, excessive SDLs addressed and water quality improved. The Murray mouth must be kept open.

It is still possible to leave a legacy of a healthy river system for generations to come. This was the intend of the Water Act and the Basin Plan and it must become a reality.

5. Respond to Native Fish Decline

Discussion Paper Options:

Consider a targeted package to restore native fish in priority locations in the Basin that may include:

1. Address barriers to fish passage and other hazards like irrigation diversion pumps.
2. Ensure ongoing maintenance of existing fishways, particularly on the River Murray.
3. Ensure there are multi-pronged approaches to manage invasive species such as carp.
4. Invest in stocking, reintroduction and targeted recovery programs for rare and threatened species.
5. Identify priority instream and riparian habitat restoration areas to support native fish recovery.

A. "What do you think of the Issues and Options Presented?"

Recent technology can now be used to revolutionise river regime studies in this space. The current availability of remote sensing tools, such as satellites and drones, allows researchers to collect high-resolution data on river flow patterns, land use changes, environmental conditions and full compliance of River practices. These technologies provide real-time monitoring, enable more accurate assessments of hydrological dynamics and facilitate timely management interventions (when needed). *Additional water is much needed and must be explicitly managed to trigger native fish breeding especially endangered/near extinct species and support their full life cycle.*

B. "Are there Other Issues and Options that should be Considered?"

Issue 1 - Restore Floodplain and Wetland Nursery Habitats

Floodplain reconnection is one of the fastest and most cost-effective actions to rebuild native fish populations (juvenile survival & breeding) in the Basin.

The cost of inaction in this space will bring continued ecological decline, lost biodiversity, and missed opportunities for substantial restoration.

Restoring floodplain connectivity is a practical, evidence-based intervention that can reverse declining trends. With increasing erratic changes in climate exacerbating current poor native fish habitat, we are left with the onerous responsibility to reverse this devastation immediately.

Focussing more attention to removal of constraints in the basin and reaching consistent flow targets would remarkably improve the chances of connectivity and river restoration leading to long term native fish recruitment/restoration.

Policy Gap:

- Existing environmental water alone cannot restore fish populations without physical reconnection of floodplains.
- Key nursery wetlands remain outside current infrastructure and restoration investment priorities.

Actions:

- **Full commitment of 3,200GL of stated environmental flow. To date, not achieved.**
- **Measurable long-term targets and progress toward ecological recovery (like the success of the 'Native Fish Strategy' objectives 2003-2013).**
- **Reconnect priority floodplain and wetland nurseries.**
- **Modify levees and regulators that are blocking natural flows.**
- **Protect wetlands (through compliance) from irrigation drainage, pollutants, pesticides, herbicides and other water quality impacts.**

Outcomes:

- Increased native fish recruitment and survival.
- Restored floodplain productivity and ecosystem resilience.

Issue 2 - Restore Riparian Vegetation and Habitat

Actions:

- **Identify priority river areas for riparian habitat restoration and fund large-scale projects with clearly state local targets. Include riparian tree planting – basin wide - through Commonwealth funded program.**
- **Livestock exclusion fencing – include regular compliance monitoring here.**
- **Re-introduction of woody debris ("snags") into rivers - (all removed in recent times). Woody debris provided perfect habitat for fish like the Murray cod & other native fish species.**

Outcomes:

- Improved shelter, feeding areas and spawning habitat.

Issue 3 - Require Fish Screens on Irrigation Diversion Pumps

Actions:

- **Introduce a Basin-wide regulation requiring fish-screening of all new irrigation pumps immediately and retrofitting of existing pumps within 1 year.**
  - **Fine mesh screens prevent eggs, larvae and juvenile fish from being drawn into pumps.**
  - **Standards should specify maximum mesh size, approach velocity and self-cleaning design.**
- **Federal–state cost-share program for retrofitting.**
- **Mandatory compliance through water licence conditions.**

Issue 4 - Address Cold-water Pollution from Dams

Actions:

- **Require multi-level offtakes or thermal pollution mitigation systems on major storage dams.**
  - **Allows warmer surface water to mix with colder bottom water before release.**

Outcomes:

- Improved downstream temperatures for spawning and survival of native fish.

Issue 5 - Large-scale Invasive Carp Suppression

The development of a centralised carp processing facility presents a significant opportunity to generate employment and strengthen regional economic outcomes. By creating an integrated carp harvesting and processing industry, the initiative can support multiple sectors of the local workforce.

- Key employment and economic opportunities include:
- Commercial fishing operations: Employing local fishers to harvest and manage invasive carp populations.
- Processing and manufacturing roles: Creating factory positions to process carp into value-added products such as fertiliser and other by-products.
- Fishing cooperatives and supply networks: Establishing partnerships to supply carp for use as bait and potential human consumption products.
- Transport and logistics: Employing transport workers to collect, deliver, and distribute harvested carp to the central processing facility.

This coordinated supply chain would not only assist in controlling carp populations but also create sustainable employment pathways and stimulate regional economic activity.

Why?

- Invasive species dominate many fish communities in the Basin

Actions:

- **Launch a basin-wide carp control program/industry that does not include the introduction of a toxic virus into already oxygen deprived polluted waterways.**
- **Establishment of a Centralised Carp Processing Facility.**

Outcomes:

- Reduced competition for food
- Less habitat disturbance
- Improved water quality
- Increase regional economic activity

Issue 6 - Species Dependant on Native Fish

Also imperative in the 'vulnerable (near extinct)' species space, is the Freshwater River mussel (Lokeri). An integral part of the ecosystem, freshwater mussels are considered ecosystem engineers of rivers; they modify substrates through burrowing, mediate water quality through filtration, provide food and habitat for other organisms and play a significant role in the biogeochemical cycling of nutrients and the reduction in turbidity of river waters.

Indeed, severe drought killed around 2.9 million freshwater mussels in the Murray Darling Basin (early 2000's) (Alan Lymbery Professor, Harry Butler Institute, Murdoch University 2022)

As sedentary, long-lived organisms, obtaining an understanding of the habitat requirements of resident freshwater mussels will provide insights into the natural hydrology of Australia's inland rivers, and the potential role healthy populations of freshwater mussels could play in influencing water quality through biofiltration.

Actions:

- **The role of refuge areas and waterways in the landscape of River mussels and their host (native) fish in the glochidium stage be recognised and the flow required to maintain the physical places in the water network be understood and incorporated into flow management plans.**
- **It is essential to deliver the ecological & economical outcomes under the Basin Plan 2012**

C. "What do you See as the Priorities?"

Reversing native fish decline in the Basin requires coordinated, on-ground actions that address and reduce multiple pressures simultaneously. Most importantly to be included in the MDB plan moving forward is to set long-term targets like those of the Native Fish Strategy project success (in state reform) (2003- 2013).

6. Managing Water Quality

Discussion Paper Options:

1. Improve the Basin Plan water quality management plan (Chapter 9 of the Basin Plan) by strengthening water quality objectives and targets.
2. Ensure Basin governments work together to manage Basin water quality hotspots by tackling the root causes of poor water quality and strengthen Basin governments' joint capacity for preventative action and early intervention.
3. Develop opportunities for First Nations peoples to participate and contribute their science and knowledges to understanding water quality, including through monitoring programs.

"What do you think of the Issues and Options Presented?"

The management of water quality in the MDB was one of the major drivers for the establishment of the Water Act, 2007 to make sure Basin water resources remained fit for purpose and appropriate for environmental, social, cultural and economic use. But while salinity issues in the Basin are under control, other water quality issues have been left unaddressed and water quality issues have been managed simply by dilution with Environmental Water volumes. However, Environmental Water was never intended for this purpose and should be reserved for its intended purpose of watering wetlands, floodplains and protecting threatened species. Water quality issues need to be addressed at their source.

It is stated that the 2025 Basin Plan Evaluation found "improved water quality" in the Basin. This is highly contested as the amount of water quality monitoring and the parameters monitored are very inadequate to be able to draw this conclusion.

It is also stated that "water for the environment has helped to manage water quality incidents by providing dilution". However, this is not the intended purpose of water for the environment. Water quality must be managed at its source and water for the environment must be used for wetlands, floodplains and ecosystem management.

Historically floods did not cause massive fish kills, like they do now. Actually, floods historically caused booms in aquatic productivity for native fish and crayfish- as documented in historic literature on the MD system. There were small areas of deoxygenation that mobile biota could move away from, but nothing like the scale of kills of recent years.

Thess fish kills are not 'natural' events. It is a consequence of our management of water and the landscape which drain into the river. This can be fixed but it requires significant change and political will.

We agree with the Discussion Paper's findings that "basin communities…are concerned about Basin water quality, including that:

- Poor water quality incidents are happening more often
- Water quality risks and impacts are not being managed well enough
- Better mitigation and land-based pollution sources is required"

We agree on the need for great integration of First Nations inputs into the management of water quality in the Basin.

We also agree on the drivers of water quality in the Basin as stated of:

- Land-use and management practices
- Invasive species such as European carp
- River regulation changing flow patterns

But would add:

- Pollution from Urban development

Also, in addition to the Basin water quality hotspots, we would add:

- Freshwater algal blooms in Lake Alexandrina and the Goolwa Channel
- South Australian Marine Algal bloom which caused environmental devastation to a 10,000's km^2 of the coast around Adelaide as well as health concerns for over 1 million people.

It is agreed that Climate Change will place more pressure on Basin water quality for all the reasons stated.

It is acknowledged that "the Basin Plan cannot manage water quality hotspots on its own" and that "co-ordinated policies and actions across the water, agriculture, environment and land-use sectors" are needed. This co-ordination needs to be initiated and managed and the Basin Plan should address how this will be implemented.

To help give this co-ordination a clear mission, the Basin Plan must set clear meaningful objectives and water quality targets on at least a sub-catchment basis and even be site specific where warranted e.g. CLLMM region and other hotspots. The Great Barrier Reef's "Reef 2050 Water Quality Improvement Plan" should be used as a guide to this activity.

Water quality in rivers and wetlands is of increasing concern, not just for town water supplies, but also for ecological health. The impacts on water quality are becoming more obvious as river flows decrease, small floods are prevented and the chance of extreme rainfall events and flood events increases. Conditions of particular concern include hypoxia, blackwater, stratification and algal blooms.

"Are there Other Issues and Options that should be Considered?"

Issue 1 – Restore Natural Rhythm of River Flows.

Base flows must be secured throughout the river systems to maintain sufficient water quality for all communities and for ecosystem health. Provision must be made in upstream Water Sharing Plans for reserve volumes to be available to disperse poor quality water events. It must be clearly understood that environmental flows should not be used to manage such water quality events and, in any case would be insufficient to provide a solution.

Due to regulation of flows, flood plain harvesting and other human interventions, the natural rhythm of rivers in the MDB has been lost, adversely affecting floodplain connectivity, flow velocities and water temperatures, with devastating effects on ecosystems. Climate Change has exacerbated this situation by increasing the frequency of major events of floods and droughts, but the number of moderate events is diminishing. So, the Basin is cycling from one extreme to the other and as a result the regular flushing of flood plains by moderate events is not occurring naturally.

This resulted in the flushing of 30 years of nutrients out of the mouth of the Murray River during the 2022-23 floods. As stated previously, this was one of the causes of the HAB in the South Australian marine environment in 2025-26. (see RLCAGG's Discussion Paper No.3 – "Control of Harmful Algal Bloom (HAB) in South Australian Marine Waters" attached)

The Removal of Constraints is part of the SDLAM Program which is meant to improve this situation by allowing more regular flushing of floodplains but there is strong opposition to this from flood plain farmers especially in NSW.

Actions:

- **Base flows must be secured throughout the river systems to maintain sufficient water quality for all communities and for ecosystem health.**
- **If natural flushes don't occur of a regular basis, there must be a commitment to include a regular flushing function of waters of 80,000ML/d coming into South Australia to simulate a moderate flood to maintain healthy floodplains through to the CLLMM region.**

- **Negotiations or enactment of suitable legislation to enforce the ability to achieve regular flushing with minor flood levels is needed to be introduced to expedite this situation.**

Issue 2 – More Water Quality Sites and Parameters must be Monitored.

We are surprised the 2025 Basin Plan Evaluation found "good progress in maintaining and limiting the decline in water quality". This is certainly not the case in the CLLMM region. To date Water Quality in the MDBP refers almost exclusively to salinity only. However, Water Quality is a much broader and increasingly important issue with many Water Quality parameter adversely affecting the Water Quality in the River. These needed to be identified and addressed at their source rather than at the end of the system. Water Quality parameters of interest include nutrients, BGA, PFAS, fertilisers and pesticides, pharmaceuticals and sediments (see RLCAG's Discussion Paper 1 – "Water Quality Monitoring in the Lower Murray River, Lakes Alexandrina and Albert, the Coorong and Murray Mouth" attached).

Water quality testing along Muray-Darling rivers is not covering sufficient parameters at enough locations frequently enough. For Lake Alexandrina and the Goolwa channel, a toxic blue green algal bloom persisted for many months in 2024 and 2025, rendering the water unusable for any purpose. Only two stations, at Milang and the Goolwa barrage, were testing for algal counts. The nearest full water quality testing site in the Lower Murray is at Tailem Bend, 30 km upstream, associated with the pipeline offtake for towns in the Upper South East region.

Water Quality is also a major issue for First Nations people as it limits their cultural practices of fishing, swimming and drinking from the river

Actions:

- **MDBA should be monitoring at more locations and a broader range of parameters including dissolved oxygen, temperature, nutrients, BGA, PFAS, fertilisers and pesticides, pharmaceuticals and bushfire run-off and sediments.**
- **This is especially the case in the CLLMM region where at least ten (10) more monitoring locations are required (as recommended by the SA EPA in 2016) to better understand and manage water quality issues in this ecologically complex region.**
- **MDBA need to work with First Nations people on how to best manage Water Quality throughout the River Basin.**

Issue 3 – Meaningful Water Quality Targets must be Established

The main focus to date in the management of the Murray Darling Basin has been on **water flows** and little attention has been given to **water quality** other than salinity. In addition, secondary indicators such as vegetation health, fish populations and migratory birds have been the main focus of reporting outcomes with little information on water quality values. Catchment-specific ecologically relevant water quality targets need to be determined and agreed with each WRP manager.

The target values need to be established with a good scientific knowledge of the ecosystem and how secondary indicators respond to a range of water quality parameters both over long periods of time (chronic effects) as well as short term extreme (acute) events. By setting appropriate target values for the primary indicators of water quality, it becomes immediately clear when the ecosystem is not in the desired condition to support healthy secondary indicators and action is required. Also, it is clear which parameter is not in compliance, and the actions can be focused on mitigating that parameter before secondary indicators are adversely affected over time.

When site specific targets have been set by the Basin Plan, such as salinity targets, good results have been achieved.

In Chapter 9 of the MD Basin Plan titled "Water Quality and Salinity Plan", 'default values' are prescribed for water quality parameters for each WRP but these were meant to be an interim

measure. These targets have not been revised for any WRP and the implementation of Chapter 9 requirements for water quality management has been far from adequate. (see RLCAG's Discussion Paper No.2 – "Water Quality Targets for the Coorong, Lower Lakes and Murray Mouth Region").

Actions:

- **Target Values for many pollutants need to be established and then monitored throughout the MDB on an individual catchment basis to identify where WQ issues are arising.**
- **Catchment-specific ecologically relevant water quality targets must be developed for all WRPs including targets for each component of the CLLMM region. Target values need to be Specific, Measurable, Achievable, Relevant and Time-bound, i.e. SMART.**

Issue 4 – Water Quality Management must be a Whole of Basin Approach.

Basin wide coordinated action is required in such areas as riparian restoration, fencing of river banks, and sustainable land management. Local efforts in integrated waterway and catchment management have shown what is possible, but they remain fragmented and under-resourced.

Proposals for a basin wide approach include that proposed by the One Basin Cooperative Research Centre (One Basin CRC) in their "BASIN SCALE: A Collaborative Declaration Towards a Sustainable and Productive Murray-Darling Basin" (One Basin CRC, 2025). This Basin SCALE Declaration is a call for System-wide, Catchment Aligned, and Locally Empowered action.

Similarly, a thorough review of land use practices has also been conducted by the Wentworth Group of Concerned Scientists and published under the title "A Blueprint for the Repair of Australia's Landscape, July 2024" which describes a suite of practical actions and investments to repair Australia's degraded landscapes, and in doing so, prepare for the unprecedented climatic pressures ahead.

The Blueprint identifies 24 practical actions which aim to:

- Repair the productive base of agricultural soils,
- Fix overallocated and fragmented river systems and rehabilitate degraded catchments,
- Restore healthy native ecosystems to a minimum 30% of their pre-1750 extent,
- Mitigate extinction risk and ensure survival of Commonwealth-listed threatened species,
- Maintain and improve the health of estuaries.

Water quality benefits from such basin wide integrated land management will be enjoyed throughout the entire basin and right down to the mouth and the adjacent coastal areas.

The past 2 years have seen extensive BGA cylindrospermopsis raciborskii outbreaks for many months in the freshwater areas of the CLLMM region and a coastal marine harmful algal bloom, also in the Northern Lagoon of the Coorong, predominantly of karenia dinoflagellates, rendering our waterways a health hazard. The marine disaster has been enabled by an extended marine heatwave with the large pulse of nutrient-rich floodwater from the 22/23 floods providing the nutrients needed to sustain this Harmful Algal Blooms (HAB). While the freshwater disaster is also likely to be due to the lingering effects of the 22/23 flood. What is the MDBA doing to ensure that these HAB do not reoccur?

Given our inability to predict or even understand the mechanisms for the BGA (cylindrospermopsis raciborskii) in the river and lakes, or the dinoflagellates (mainly karenia Mikimotoi and/or karenia cristata) in coastal waters, additional Water Quality monitoring stations and additional parameters monitored, must be established as well as control of nutrients.

Actions:

- **Water quality management needs to be a whole of basin approach e.g. Flood Plain Management and "Blueprint to Restore Australia's Landscape" by The Wentworth Group of Concerned Scientists.**

- **Despite the fact that Basin States are predominantly responsible for land management, pollution control and natural resource management, the MDBA have the responsibility through the Basin Plan to identify where water quality of the Basin is suffering due to inadequate action or poor land management by the Basin States.**
- **In addition, MDBA must improve WQ Monitoring by establishing additional Water Quality monitoring stations and monitoring additional parameters throughout the Basin (as stated in Issue 1). A whole of basin approach to monitoring will allow "hotspots" to be identified where nutrients/ faecal material/ "for ever chemicals"/ pharmaceuticals/ fertilisers/ are being added to the River.**

Issue 5 - Better Community Reporting of Water Quality

To gain trust and support for water quality actions within the Basin, the community needs to be informed and engaged in water quality issues through well prepared and readily accessible results of monitoring and reports analysing this information and presenting it in comprehensible formats such as annual report cards.

There was a lot of confusion from our swimming community when the algae first hit the Goolwa channel as to where the monitoring had been carried out and where the toxic locations were (several reports have stated that Milang was not affected and initially Clayton was not referenced).

Actions:

- **To ensure community engagement, an accessible comprehensive centralised dashboard of current WQ monitoring data compared to target values must be established.**
- **Regular meaningful report cards (e.g. annual) including water quality, cultural and ecological performance against meaningful and appropriate targets must be prepared and made readily available to the public .**
- **A picture saves a thousand words. We recommend a detailed map of the CLLMM region be included with algae reports showing reporting locations and toxicity warnings?**

Issue 6 – Control of Urban Pollution entering the Rivers of our Basin.

We have increased pollutants, pesticides, insecticides, nutrients, chemicals and pharmaceuticals in the river systems. The State of the River Audit had the area downstream of the Vic/NSW as poor. Do we have a problem with our wastewater treatment for urban areas? Is it a problem in shack areas? Was it a problem when presumably many of these treatment facilities were underwater during the floods?

It should also be noted that water is supplied to 75% of South Australia's population outside the Basin, which sets the quality controls for drinking water supplied to five pipeline off-takes in the Lower Murray Valley.

The BasinPlan need to recommend water monitoring along the river so pollution sources can be identified and steps can be put in place to improve conditions?

Actions:

- **We acknowledge that Town Wastewater and Drainage are State responsibilities, but MDBA must work with each State to promote recycling of wastewater effluent and establishing polishing ponds or wetlands to improve the quality of drainage water entering the River.**
- **As stated previously, MDBA must conduct additional Water Quality monitoring both in the number of monitoring locations and parameters monitored which will assist in the identification of pollutants from urban sources along the River.**

Issue 7 – Control of the use of Pesticides in our Basin.

Waterways that flow through farmland and from roadside drains are all regularly contaminated by pulses of pesticides from a range of sources from agricultural spray drift, farm run-off, council weed control and urban uses. Their presence is often transitory, so they are not always detected. Unfortunately, pesticides leave a legacy even after they have passed through the system, adsorbed into the river floor sediment or been broken down into other metabolites.

Australia continues to permit many chemicals that have been removed in the EU due to their adverse toxic impacts on the environment, such as neonicotinoids and fipronil insecticides. These compounds have severe impacts on insects at parts per trillion exposure levels. The declines in insects across agricultural areas have been largely attributed to pesticides and loss of vegetative habitat (Sanchez-Bayo & Wyckhuys, 2019). The levels of neonicotinoids reported in Australian waterways are rising, where there is monitoring (outside of the MD basin) taking place (Warne, Turner, Davis, Smith, & Huang, 2022).

Unfortunately, some of our aquatic macrofauna, like crayfish, are also acutely sensitive to these chemicals, contributing to some species now being listed as threatened species. Species like crayfish are critical to consuming the influx of organic matter to rivers. Through eating the plant material, the crayfish make it unavailable to bacteria and help reduce its deoxygenation potential. Further, the crayfish assimilate the organic material into high value proteins and fats which can then benefit the consumers of the crayfish like our predatory and native fish like Murray Cod and Golden Perch and freshwater turtles and silver perch.

Pesticides are also known to stress biota, making them more vulnerable to extreme conditions such as temperature, DO, etc. as is expected due to Climate Change.

There must be regulations to control the use of pesticide/chemical types used alongside of the River e.g. Western Australia's control of fertilisers used for domestic purposes (Fertiliser Partnership website http://www.fertiliserpartnership.agric.wa.gov.au), etc?

Actions:

- **Land users must have stronger regulation and enforcement in the use of pesticides to avoid contamination of waterways.**

Issue 8 – Control of European Carp

The population of the introduced European Carp have increased dramatically since their introduction in the 1960's. Their feeding habits stir up river sediments, reducing water quality, increasing turbidity, destroying aquatic vegetation and eating juvenile native fish. Recent evidence ("Mussels in the Mud" project being prepared by the CLLMM Research Centre) indicate that the Carp are also likely to be responsible for the loss of juvenile freshwater mussels in the CLLMM region due to them feeding on the juvenile mussels while they are still small enough for the Carp to digest.

The current plan of evaluating the use of the Cyprinid herpesvirus 3 (carp virus) as a potential biocontrol agent will not be completed before 2028 and the likelihood of it being implemented is highly doubtful. No other alternatives are currently even being considered at this time.

Actions:

- **Alternatives to the Carp Virus to control European Carp in the MD Basin need to start immediately as these may be preferred regardless of the outcome of the evaluation of the carp virus. Alternative control measures include promoting/subsidising beneficial uses of the carp such as fertilisers, pet food, oils, etc. need to be started immediately.**

Issue 9 – Need to Control Salinity Levels in the Coorong

The Coorong and especially the Southern Lagoon is no longer being flushed adequately to maintain salinity levels suitable to sustain healthy ecosystems (as established in the Basin Plan) and major fish kills have occurred regularly in recent years (i.e. 2024 and 2025) when salinity levels have become excessive.

The "Healthy Coorong, Healthy Basin" program being implemented by SA DEW is investigating physical infrastructure to address the salinity problems of the Coorong, but measures could be taken to improve the Coorong in the interim.

Actions:

- **Modelling and trialling freshwater releases through the barrages to coincide with tidal and wind events that may most effectively get a turnover of water in the Southern Lagoon should be carried out.**

"What do you See as the Priorities?"

Box 8.3 provides a reasonable summary of the options proposed by the Discussion Paper:

- Improve the Basin Plan water quality management plan (Chap. 9)
- Basin governments to work together to manage Basin water quality hotspots
- Develop opportunities for First Nations peoples to participate in water quality management

However, these need to be detailed and expanded as follows.

- Provisions for minimum base flows and end-of-system flows must be included in Water Sharing Plans.
- There must be a commitment to provide a regular (1 in 3 years) flushing function of waters of 60,000 to 80,000ML/d coming into South Australia.
- A "shared and coordinated program" is needed to:
  - Identify water quality hotspots
  - Identify diffuse pollution sources
  - Strengthen joint capability for prevention and early intervention
  - Streamline regulatory and administrative processes
  - Support flow related decision making
- Chap. 9 of The Basin Plan (Water Quality and Salinity Management Framework) needs improvement with meaningful objectives and targets to be set for all catchments and hotspots.
- Meaningful reporting of water quality monitoring against water quality targets and objectives must be prepared and conveyed to all Basin communities with clear and easily interpreted reporting.
- First Nations peoples need to be consulted and actively involved in delivering the Basin Plan.

Our priority for actions is as per the order of the issues raised above i.e. Issue 1 to Issue 9. This does not infer that the issue of "Issue 9 – Need to Control Salinity Levels in the Coorong" is the least important but rather the additional actions over and above what is currently happening are the least urgent of the actions recommended for the other issues raised.

The actions under Issues 2 to 5 are all interdependent, with the need for more monitoring (Issue 2) being essential before the establishment of meaningful targets (Issue 3) to make the monitoring more useful and identify the need for catchment improvements in water quality (Issue 4). Issue 5 is then making this monitoring information available to the public.

Issues 7 to 9 are then specific water quality issues and are ranked in order of how achievable and effective the actions recommended may be.

7. Water Infrastructure and Critical Human Needs

Discussion Paper Options:

1. Modernise water infrastructure across the Basin to reduce the risk of asset failure and safety risks, and to deliver on a broader range of values and interests, including improved Basin Plan outcomes.
2. Consider minimum water resource plan requirements for state-based extreme event water planning to ensure adequate consultation processes and that planning is underpinned by robust climate assumptions.

"What do you think of the Issues and Options Presented?"

The fourth paragraph in the Discussion Paper refers to some of the infrastructure and mentions "weirs – alongside modern fish passage" which seems to refer to upstream structures that separate rivers and flood plains. There does not seem to be any mention of what we refer to as "barrages", which are a form of weirs. The barrages we refer to are at Goolwa and Tauwitchere and are well worth describing issues and options. In fact, the whole section seems to refer to the upstream section of the river.

Ongoing lack of river flows since the flood means that expensive dredging must continue at the Murray Mouth because there is not sufficient outward flow to counteract coastal sand being driven in by tidal action and storms (Prof Nick Harvey). With sea level rise this problem will increase. No-one really knows how the seasonal variation in weather patterns and the resultant change in wind regimes will impact the Murray Mouth sand drift.

We are aware of ongoing disinformation (misinformation designed to be misleading) in upstream communities that removal of the barrages at the Murray Mouth would return the Lower Lakes and estuary to a "natural" condition and release additional water that could be transferred to upstream irrigators. There is extensive sound scientific information to refute this view and highlighting the very serious consequences to downstream communities if the barrages are removed. The highly respected Lower Lakes Independent Science Review by CSIRO for the MDBA (Chiew et al. 2020) found that the Lower Lakes were largely fresh prior to European settlement. This finding was based on palaeoecological evidence, water balance estimates, hydrological and hydrodynamic modelling, traditional knowledge of the Ngarrindjeri People and anecdotal evidence of early explorers and colonists.

The pre-development long term average annual inflow from the Murray River was more than 13,000GL. Upstream development has reduced the river inflow by about half, resulting in more frequent incursion of seawater into the Lower Lakes. The estuary could only be returned to a "natural" condition if all upstream storages were removed to restore natural river flows, before removing the barrages. If the barrages were removed but all upstream storages remained in place, seawater tainted and poor quality water would reach the Adelaide water supply pipeline offtakes within weeks.

Without barrages, water supplies in towns, irrigators and farmers around the Lower lakes cannot be maintained. Without the barrages, water supplies to 75% of South Australia's population, agriculture and industries cannot be maintained. Without the barrages, the freshwater values in the Lower Lakes cannot be maintained. This would significantly change the ecological character of the Ramsar listed site, which is a wetland of international importance that Australia has an international obligation to maintain. This would also impact traditional owner values and other socio-economic values such as tourism that are reliant on a healthy Coorong, Lower Lakes and Murray Mouth system.

Removing the barrages would not result in any water savings, as the evaporated volume is included in the minimum entitlement for South Australia. This volume of water is required to transport and

deliver water to all communities and licenced irrigators along the 680 km valley and around the Lower Lakes and to supply critical water supplies to Adelaide and most regional areas in South Australia, which only has limited water storage capacity due to lack of suitable dam sites. These flows are also essential to export accumulated salt, nutrients, algae and organic matter out of the Basin.

The focus on Chapter 9 seems to be more on Northern Parts of the basin and some of the challenges likely to be experienced. To address this, the Basin Plan needs to be rewritten to include this information on the Southern area.

Challenges in the southern part of the basin are likely to be quite significant as well.

Climate Change effects in the southern part are likely to be as, or more likely more challenging than further upstream. Components of climate change that lead us to say this are (a) ambient temperature, (b) rainfall variation and (c) sea level rise.

There has been much discussion of air temperature increase. Suffice to say all increases in average temperature will lead to greater evapotranspiration which will lead to a greater demand for water for both critical human needs and agriculture which is the reason for the human needs.

Rainfall in the southern part of the Basin is likely to decrease. This is no longer in doubt. Runoff into the basin does not behave linearly to rain falling over the catchment and when considered with higher temperatures will cause considerable stress making less water available to critical users in the future.

As was mentioned at the River Reflections conference, another climate statistic that we feel has not been adequately discussed is the number of consecutive days where the temperature is greater than a threshold. We had felt that in the past, the number of days of consecutive maximum temperatures greater that say 47 or 48 would be quite low but this year many sites in SA and northwest Victoria experienced three. This in itself, will be a risk to human health. Climate change will only increase the risk of sequential days of extreme maximum temperature. We are unclear as to whether sequential maximum temperature events are the key indicator or just the total number of days per year where the average daily temperature (i.e. the average of 24 one hourly observations) is greater than say 38 or 40 is a better indicator.

There is a disproportionate focussing on water volumes and not “fit for purpose water volumes”. In the past whenever water quality has been mentioned, the defacto water quality indices seem to be salinity. To satisfy our concerns, much more work needs to be done to analyse the quality of used irrigation water when it is returned to the river and from which other irrigators are trying to make a living. There are huge analogies between the Murray Darling Basin and the river catchments upstream of the Great Barrier Reef where outflows from the river systems have damaged the GBR. In both areas high agricultural production is potentially having a deleterious outcome on downstream users.

“Are there Other Issues and Options that should be Considered?”

Issue 1 – Managing Salinity in Lakes Alexandrina and Albert

With Climate change, management of the Lower Lakes, Coorong and Murray Mouth will become more challenging. Sea level rise would cause more seawater to flow into the Lower Lakes while catchment runoff in the southern Murray Darling Basin is projected to decline under a changing climate. A key concern is likely step changes as critical thresholds are breached, with sudden shifts in ecological condition and processes which may be irreversible (IPCC 2023). There are gaps in the knowledge of the biophysical impact under a changing climate. There is a need to develop adaption

options to manage the social, environmental and economic vulnerabilities, not just for the Lower Murray valley, but for the whole Murray Darling Basin system.

The barrages were completed in 1940 and in spite of them appearing to the lay person to be in reasonably good condition, they are probably near the end of their engineered life span. Accordingly, mention has to be made of the need to keep them in at least good working order for the duration of the plan's future.

Other major risk to the barrages is climate change. In all model scenarios, the sea level is expected to rise. This is expected to increase by 0.13m by 2030, by 0.23m by 2050 and by 0.62m by 2099 or maybe 0.20m more depending on the melting of the Antarctic Ice sheet

High salinity of Lake Alexandrina is closely related to the frequency of overtopping events at the barrages – these are events where high astronomical tide levels in conjunction with gale force winds which cause huge storm surges and wave action causes large volumes of sea water to crash over the top of the barrage structure. In 2025 there were four record high tides at the mouth which led to huge amounts of sea water in the Goolwa Channel and unseen salinity levels at Clayton. As sea level rises, the frequency of these events will increase.

It is possible that as sea level rises the number of times this will occur will be non-linear in frequency and cause considerable degradation to the water quality.

Risks to the physical state of the barrages are therefore going to increase. It is likely that the design characteristics were that the wave action was expected to be at or lower than current water levels and the buffeting at an elevated level may compromise their stability.

The current level of the lakes was also designed to maintain a "head difference" between the fresh water in the Lake and the ocean water. Water is free to respond to changes in hydraulic pressure caused by water level differences, and if the ocean sea level rises, there will be a greater ingress of high salinity water from under the sand hills and under the barrages.

Of concern, is that for over half of a year, taking water from lake Alexandrina was prohibited due to BGA (cylindospermopsis raciborski). This volume of water that was unsuitable must equate to about 2,000Gl. The volume of the Hume Dam is quoted as being near 3,000GL, which equates to a significant loss of critical water availability. We must develop solutions to minimise this loss of water.

In an attempt to live with Climate Change related sea level rise, improved designs for barrage gates need to be implemented. This will allow for more timely water diversions to the Coorong and the timely removal of sea water from overtopping events. When the barrages were built 90 years ago "logs" were probably fair and reasonable. In the 2020's with ever increasing over topping events, being able to remover some of that sea water is important and to that extent radial gates which allow the operators to adjust the level of the gates rather than just turn the water on or off as is the current practice. More of these gates are needed.

Actions:

- **The barrages need to be kept in good working order for the duration of the plan's future.**
- **The barrages may need to be redesigned or heightened to limit the amount of overtopping for the duration of the next portion of the MDB Plan.**
- **World's best software needs to be introduced to allow operators to maximise the benefits to the Coorong from the reduced water volumes available.**
- **To offset sea level rise, if we want to keep the salinity down to a critical human needs level, more water will be needed in the lakes**.

Issue 2 – Licensing and Maintenance or Removal of Aging Infrastructure

Across the Basin there is extensive in-stream and floodplain infrastructure (e.g. weirs, regulators and levees) that impedes the passage of flow, some of which are now redundant. All of this infrastructure is past 70% of their life and many are will need to be rebuilt or refurbished over the next 20 years.

Review and upgrade of outdated in-stream and floodplain infrastructure is needed to reduce risks to people and ecosystems, and support long-term river health. The Basin Plan should require a systematic review and periodic relicensing of in-stream and floodplain water infrastructure (e.g. weirs, regulators and levees) to ensure that, over time, only infrastructure that is safe, delivers justified and ongoing socio -economic benefits, and applies all practical means to reduce social and environmental impacts is retained. Other structures should be progressively rebuilt or removed to minimise negative environmental and social impacts

Much of the man-made infrastructure items will have been impacted by sand being dumped or deposited and making the structures less efficient for transporting larger volumes of water. The solution to this will have to be medium sized dredging around these structures and the most culturally efficient way of removing the sand.

The River channel may also be referred to as "infrastructure", in which case, there is a need to reclaim the Barma choke, where a century of gold mining spoil is impacting the flow of the river for downstream users?

Irrigation pumps may also be seen as infrastructure. Changes in River levels due to Climate change may impact the water intake locations e.g. Mannum but may also be Mildura or Shepparton. Also, there was some talk at one stage about bridges needing to be rebuilt as part of some plans to achieve improved efficiencies.

Actions:

- **The Basin Plan must require licensing of all infrastructure which are periodically reviewed and require unsuitable structures to be either rebuilt or removed.**
- **Many structure are going to need to be rebuilt, refurbished or moved over the next 20 years.**
- **River channels need to be dredged or reclaimed and River banks stabilised.**

Issue 3 - Carp virus in relation to Critical Human Needs.

If carp amount to up to 90 % of biomass, that's an awful lot of dead material. Presumably those volumes of dead material will make the water anoxic – i.e. no oxygen in the water. It arguably follows that the 10% of the remaining fish – presumably native will be at great risk and will probably die.

If the river flow is slow when the virus is released, the dead fish will remain stagnant and the water will be totally anoxic. It will arguably be unusable for irrigation, stock water or critical human needs as well as tourism.

If the flow is at high, the dead fish and poorer quality water will flow down to SA where the water will be unusable.

Then when the river water flows into the sea, the poorer quality water will impact on local fishing, as it did during the 2022/23 floods. Fish, Cockles, etc and tourism were all adversely affected.

How can we be sure that the virus will only spread to other carp? The study of tolerance of the carp virus seems to have been on several varieties of native freshwater fish. However, can we be sure that

it will not impact negatively on ocean native fish and other sea life. It is most likely that the poor anoxic water being discharged into the sea will have a negative impact on sea life. The warm and less saline water being discharge from the mouth, will stay as a shallow water mass on the surface for at least 100km and in doing so cause a large degradation in the quality of the water for the local sea water species.

Uptakes for town water for critical human needs will be impacted. Much more treatment will be needed to get the water up to drinking water standards. There will have to be extensive education of the public to safeguard human health. Recreation and tourism industries will be decimated.

Actions:

- **Thousands of tons of dead and rotted carp will need to be removed throughout the catchment so that downstream impacts are minimised to allow the water quality to be suitable for critical human needs.**

Issue 4 – Water Quality Targets must be Established for Critical Human Needs.

Critical Human Needs water quality needs to be identified in the Basin and suitable water quality targets determined. Water quality targets have been set for salinity but meaningful targets for other parameters such as dissolved oxygen, nitrates and phosphates and standards for pesticides and plant poisons need to be met 100% of the time.

Actions:

- **Suitable longitudinal monitoring of pesticides and plant poisons must be undertaken. Funding must be forthcoming to enable this monitoring to be on-going indefinitely.**
- **There must be suitable compliance measures set into the system so that if these critical levels are exceeded, emergency measures can be taken immediately to remedy the water quality issues within a specified time and if not, penalties must be applied.**

Issue 5 – Pro-active Measures must be taken for Climate Change Impacts.

Climate change predictions are that the maximum air temperature will increase in the southern Basin. For example, in Renmark the average summer maximum temperature will increase by 1.8 degrees by 2050 and by 2.2 degrees by 2075.

This will place parts of the Basin under immense stress for the types of crops they now support.

Meanwhile temperature data for the Fleurieu Peninsula around the Lower Lakes are milder. This suggests that parts of the Southern Basin, such as Langhorne Creek and the river flats south of Murray Bridge may be able to support intensive agriculture and that they may become the market garden capital of southeastern Australia. High quality water will be needed to produce these crops. Water of critical human needs quality will be needed to support these industries. High risk potential solutions such as the carp virus and the likely catastrophic pollution of the river water must be prevented.

Mean tidal levels along the SA coast are expected to rise by 0.13m by 2030, by 0.23 by 2050 and about 0.60m by 2099. It has been estimated that the 2099 estimate may be underestimated by 0.20m as the collapse of the Antarctic ice sheet may be underestimated.

We need to understand that Climate Change is with us now and the fact that climate projections for 2050 are in our children's lifetimes and 2070 and 2080 are in our grandchildren's. It is not far away. We owe it to them to give them the best opportunities in life that we can.

The occurrence of over-topping of the barrages events will increase dramatically. Redesign of the barrages is necessary. Better or more fast responce “logs” or gates are necessary. Funding for such upgrades needs to be made available.

Actions:

- **Climate Change is with us now, we can not wait until our crops fail to grow in the traditional locations, or our barrages no long keep the saltwater out. We must better understand future consequences of Climate Change and take pro-active action now to adapt and not wait till things fail before acting as this may be too late.**

“What do you See as the Priorities?”

Urgent attention is needed to assess the structural integrity of the nearly 90 years old barrages in the CLLMM region as these are critical elements in maintaining freshwater supply to over 1 million people in South Australia. The threat to their structural integrity is increasing due to sea level rise and storm surges as a result of Climate change.

Much good work has been done to lower the salinity. However, there are other water quality issues that will adversely affect critical human needs such as nutrients from animals and agriculture, fertilisers from crops and the residual from herbicides and pesticides. Additional monitoring to identify potential health risks needs to be undertaken.

8. Improving Basin Plan Regulatory Design

Discussion Paper Options:

1. Consider ways to reform WRPs by focusing the requirements on what matters most or shift away from accreditation to oversight of Basin states.
2. Improve SDL accounting and compliance including clarifying definitions and improving consistency and knowledge.
3. Refine water trading rules to improve how exemptions for environmental water delivery work, support compliance and align with broader water market reforms.
4. Streamline Basin Plan reporting to support compliance, outcomes assessment, First Nations participation and adaptive management.

"What do you think of the Issues and Options Presented?"

Regulation and enforcement are always going to be a challenge when there are so many Federal, State and even Local Government bodies with some jurisdiction regarding management and control of the many various inter-dependent issues involved. However, by setting clear principle and priorities embedded in the Basin Plan then implementation and improvements can be achieved. A clear example of this has been the control of salinity in the Basin.

However, some issues remain unresolved such as four (4) WRP in NSW still need to be finalised. These are many years behind the 2019 deadline. Undoubtedly there is room to reduce some of the onerous requirements for WRP accreditation, but these Plans are fundamental for the implementation of the Basin Plan and such issues of SDLs and water quality management should be non-negotiable.

The appointment of an Inspector-General for Water Compliance in 2021 to enforce stronger controls, and tighter regulation of Water Markets as part of the Restoring Our Rivers Act of 2023 have all been welcomed improvements even though they should have been introduced right from the start of the Water Act 2007 as a lot of trust and confidence has been eroded during these early years.

It is agreed that WRPs must focus on core areas that matter most. These include:

- ensuring SDL compliance
- ensuring no net reduction in the protection of planned environmental water
- protecting held environmental water as it moves through the system
- addressing risks from groundwater extraction
- requiring genuine engagement with First Nations peoples in water resource planning and implementation, underpinned by free, prior and informed consent
- aligning the development of WRPs with the First Nations purpose of the Basin Plan
- prioritising river connectivity between planning areas, including across borders, at crucial times
- ensuring critical human water needs are clearly identified, prioritised and underpinned by robust monitoring.

In addition, better information is needed to improve the accuracy and integrity of SDL accounting, including interception by forestry plantations and floodplain storages.

"Are there Other Issues and Options that should be Considered?"

Issue 1 – Credible Regulation requires stronger Compliance and Transparency

Public confidence in Basin governance depends on effective monitoring, transparent reporting, and visible enforcement.

Globally, environmental laws tend to be poorly enforced, and water law in Australia is certainly no exception. Indeed, where there is water, there is money and where there is money, there is power.

And in a modern democracy, power finds its ultimate expression in the interplay between industry and politics.

If we are prepared to accept the inherent nexus between water, politics and power, and the very real possibility that even good laws will not be enforced, we need to do three things:

- Ensure that water laws include robust transparency and governance provisions that are designed to thwart political interference, maladministration and corruption.
- Establish truly independent water agencies that are incentivised – and legally required – to rise above the political fray.
- Consider the role that deliberative democracy could play in transforming the cultural context within which water management, law and decision-making takes place.

We need to enshrine deliberative democracy in the management of the MD Basin. This places conversation, diverse views, informed reflection and respectful listening at the heart of decision-making processes. Empirical research has shown that deliberative democracy reduces polarization, promotes considered judgement and counteracts populism. Deliberative democratic processes have been used around the world to amend constitutions in otherwise fractious political settings and to shift perspectives in relation to ideologically-driven issues such as immigration and environmental management.

Regulatory reform should strengthen national oversight of water compliance, harmonise monitoring standards across Basin states, and ensure publicly accessible reporting of water extraction and environmental outcomes.

Strong, transparent regulation is essential to maintaining trust in the Murray–Darling Basin Plan and ensuring it delivers a healthy working river system. Without transparent compliance the strong shift needed in this space will not change.

WRP may be made less bureaucratically onerous with unnecessary reporting eliminated, but reporting on critical issues such as compliance with SDL, water quality monitoring and control, etc should be toughened up with penalties for late or non-compliance.

Actions:

- **Deliberative democracy must be enshrined into the MD Basin Plan to ensure community driven water management, law and decision-making is practiced.**
- **MDBA must implement these strong reforms, the Australian Government/Minister Watt would oversee them, independent audit bodies would ensure accountability, and state regulators would assist with on-ground enforcement.**
- **Enforcement/compliance findings in each State must be known/listed and made publicly available.**
- **Reporting required by WRP may be simplified but reporting on critical issues such as compliance with SDL and water quality targets must be toughened with penalties for late or non-compliance.**

Issue 2 – SDLs must remain Science-based and Climate-ready.

The Water Act 2007 requires Sustainable Diversion Limits (SDLs) to be determined using the best available science. Regulatory reform should strengthen safeguards to ensure diversion limits remain consistent with ecological sustainability as climate conditions change.

Environmental Water entitlements must not be degraded due to decreasing allocations as River flows decrease over time due to Climate Change. In fact, Environmental demand for water will increase due to higher temperatures from Climate Change causing higher evapotranspiration.

Action:

- **The Environmentally Sustainable Level of Take (ESLT) must be re-evaluated biannually, using updated climate and hydrological modelling, with precautionary protections where uncertainty exists. and**
  - **Additional Environmental Water needs, over and above the current 3,200 GL/yr, recovered,**
  - **SDLs for each WRP must be reassessed,**
- **Extractive Water Entitlements must be reduced by an equal % as River flows, SDLs and ESLT reduce due to Climate Change.**

Issue 3 – Completion of all Water Resource Plans by 12/26.

When will all WRP's be completed and might these delay the release of the MDBP Review which is due by 12/2026?

Actions:

- **All outstanding WRP must be completed before the MDBP Review is issued. Penalties must be introduced for late delivery or non-compliance.**

Issue 4 - Health of the River must be Primary Measure of Basin Plan Success

Conditions at the end of the river provide the clearest indicator of whether Basin-wide water management is working. The ecological health of the Lake Alexandrina, Lake Albert, Lower River Murray region, Coorong and the Murray Mouth reflects the cumulative impact of water decisions across the Murray–Darling Basin.

Action:

- **Regulatory frameworks must explicitly prioritise end-of-system environmental outcomes and ensure flows are sufficient to maintain an open Murray Mouth and flush accumulated salt, nutrients and other pollutants from the system.**

Issue 5 – Need to Promote Environmental, Social and Economic Outcomes.

With the change in unbundling and commodification of water rights leading to significant land use changes and shifts in crop types (i.e. crops needing an abundance of water for growth or dry land cropping adjustment) community structures and local economies have been negatively impacted. Are there (moving forward) stronger regulations and compliance to align land/water use with environmental, social & economic outcomes.

Empirical research has consistently shown that voluntary water buybacks are NOT the reason for negative impacts on rural communities. This can not be used as a scapegoat for poor planning and regulation of rural communities.

Actions:

- **Control of land use and crop production are mainly State Government issues, but MDBA must set targets and objectives to push the Basin States to recognise the importance of environmental, social and economic outcomes?**

Issue 6 – Priority for Water to Australian Sustainable Food Producers

What measures are in place or proposed to protect Australia's food security, so these producers do not have to compete for irrigation water allocations with food and fibre grown for the export market or speculators pushing the price of water higher?

Australia produces three (3) times as much food as it needs for our own consumption and then 30% of what is produced goes to waste because of aesthetics or other marketing reasons.

Around 80% of what is produced by irrigators in the Murray Darling Basin is sent overseas. With regards to food staples such as rice, vegetables and fruit, there is only around 10% of what is produced that stays in Australian for consumption. Exports produce profits for a few, often larger

foreign owned companies, who outcompete small local farmers for water entitlements and ignores the need for a healthy Environment.

We are effectively exporting MD Basin water overseas. We are not going to run out of food because water is allotted to the Environment. We can only run out of food if Irrigators choose to export what they grow rather than feed Australians. As seen from the recent fuel shortages, food supplies can be easily disrupted, producing price spikes and shortages of food supply due to farmers deciding new plantings to be unprofitable.

An incentive scheme to farmers guaranteeing to supply food for the Australian domestic market would help guarantee food security and stabilise food prices. Perhaps a scheme similar to how European food producers are protected through a comprehensive, multi-layered framework designed to guarantee quality, preserve traditional production methods, and shield them from market volatility and unfair competition may be beneficial to Australia.

Actions:

- **Water Markets must give priority to Australian sustainable food producers over export products.**
- **Water for the Environment must be prioritised over irrigation water used for exports, especially by large foreign owned companies who care little for Australia's environment.**

"What do you See as the Priorities?"

Priorities are as set in the order of issues presented above i.e. highest priority is Issue 1, second highest is Issue 2, etc. These can be summarised as follows:

- Deliberative democracy must be enshrined into the MD Basin Plan to ensure community driven water management, law and decision-making is practiced.
- Regular review of SDLs and improve SDL accounting and compliance, including clarifying definitions and improving consistency and knowledge.
- Complete all outstanding WRPs. Then reform WRPs by simplifying the accreditation requirements. MDBA should still have a coordinating role with these.
- Refine water trading rules to improve how exemptions for environmental water delivery work, support compliance and align with broader water market reforms such as support for domestic food security.
- Streamline Basin Plan reporting to support compliance, outcomes assessment, First Nations participation and adaptive management.
- Incentives to farmers guaranteeing supply of food for the Australian domestic market.

9. Improve Science and Knowledge to Inform Basin Water Management

Discussion Paper Options:

1. Build understanding of the complexities and interactions of environmental, economic, social and Cultural outcomes in the Basin through sustained research capacity, community involvement, and a greater focus on science synthesis, collaboration and communication.
2. Strengthen opportunities for First Nations peoples to contribute their science and knowledges.
3. Monitor water flows, availability and river connectivity, and how these interact with ecosystems and climate change, to ensure effective water planning and delivery across the Basin.
4. Enhance groundwater knowledge across the Basin.
5. Increase our knowledge on how native fish can be better protected at the Basin scale.
6. Improve understanding of water quality drivers and impacts to deliver a greater predictive capacity, so water managers can pre-empt events.
7. Address knowledge gaps preventing more targeted action shown by the initial SDL assessments relating to groundwater, environmental condition and non-water drivers.
8. Improve methods for SDL accounting to more accurately estimate water take and future water demands.
9. Improve modelling and predictive capacity by continuing collaborative development of models and forward-facing tools with Basin governments.

"What do you think of the Issues and Options Presented?"

Science and the development of better knowledge and understanding of the Basins environmental, economic, social; and Cultural systems should be basic to the management of the Basin. Synthesis of First Nations knowledge with modern science will also achieve better results.

The issues and options proposed are all supported but some additional measures need to be included as set out below.

"Are there Other Issues and Options that should be Considered?"

Issue 1 – Transparent and Reliable Modelling of Current ESDL.

Fundamental to the Water Act, 2007 and in turn the MD Basin Plan is the sustainability of the environment by ensuring water extraction from rivers does not excessively disrupt the natural environment and the determination of this Environmentally Sustainable Diversion Limit (ESDL) must be based on the best available science.

Best available science has progressed considerably since the Basin Plan was introduced in 2012 and the MD Basin Plan Review has failed to determine the best estimation of the current ESDL which must be a fundamental failure of this review.

Actions:

- **The Environmentally Sustainable Level of Take (ESLT) must be re-evaluated biannually, using updated climate and hydrological modelling, with precautionary protections where uncertainty exists. and**
  - **Additional Environmental Water needs, over and above the current 3,200 GL/yr, recovered,**
  - **SDLs for each WRP must be reassessed,**

Issue 2 – Investigate and revise the Actual Volumes of Water recovered.

Colloff and Pittock (2022) found that only around two thirds of recovered Environmental Water is actually being delivered. More rigorous accounting and reporting of Environmental Water is needed as part of 450 GL/yr Efficiency Measures and the 675 GL/yr SDL Adjustment Mechanism. Considerable amounts of money have been invested into these two programs but the return in actual volumes of water saved are very questionable and are not back up by any rigorous measurement or monitoring.

Actions:

- **Detailed investigation must be carried out urgently to determine the actual volume of water recovered, especially wrt Efficiency Measures as part of the 450 GL recovery program and the 675 GL/yr SDL Adjustment Mechanism.**

Issue 3 – Develop System Specific Ecologically Relevant Water Quality Targets.

Additional monitoring alone will have little benefit unless meaningful targets are established by determining the ecological response to various water quality parameters to determine trigger values where immediate action is required as well as monitoring to determine when long term chronic effects may occur in any specific ecosystem.

Actions:

- **Develop Specific Ecological Relevant Water Quality Targets for each ecosystem in the Basin.**

Issue 4 – Support Improved Land Management Trials.

Land degradation is increasing in the Basin resulting in siltation and other adverse effects on the River. This will only be exacerbated by Climate Change when traditional land uses will become increasing stressed. Better land management practices are desperately needed and adaptation of land uses due to a changing climate need to be investigated.

A climate-ready Basin Plan will improve the health of the Basin's ecosystems, protect drinking water supplies for towns and cities, provide greater certainty for irrigators and regional businesses, reduce the risk of future economic shocks, and support Aboriginal Nations to care for Country.

The Wentworth Group of Concerned Scientists has released a document titled "Blueprint for the Next Murray-Darling Basin Plan". This document is available here https://wentworthgroup.org/wp-content/uploads/2026/04/Blueprint-for-the-next-Murray-Darling-Basin-plan-FINAL.pdf .

The Blueprint reframes the Basin Plan to better align with Australia's commitments under the Convention on Biological Diversity and the Kunming–Montreal Global Biodiversity Framework.

The five reform recommendations are to:

1) Set Basin Plan targets to protect and restore at least 60% of the Basin's wetlands (including aligning with the Global Biodiversity Framework '30 by 30' target) and sustain wetlands through priority flows and restored river, floodplain and groundwater connectivity
2) Embed climate change into water planning through a dynamic, responsive, evidence-based framework that updates water plan rules, manages climate risks to shared resources, and makes trade-offs transparent
3) Uphold Aboriginal peoples' values of water and their rights by returning water and decision-making authority to Aboriginal Nations through secure entitlements, Aboriginal-led governance and cultural targets in water plans
4) Support communities to thrive in transition by securing safe drinking water, backing social and economic diversification, and investing in fair, place-based transition pathways
5) Improve governance and accountability by simplifying rules, strengthening oversight, and reporting honestly and regularly on outcomes—supported by transparent modelling and water accounting linked to targets

Even though these are generally Basin State responsibilities, the Federal Government could support science-based trials of improved land management practices such as those supported by:

- The Malloon Institute which worked towards hydration and drought tolerance of catchments.
- The Wentworth Group's "Blueprint for Recovery of Landscapes" which promotes a whole of catchment approach to stabilising land and protecting waterways.
- The Great Barrier Reef's "Reef 2050 Water Quality Improvement Plan" which is a successful attempt at integrated catchment management to protect the environment.

Actions:

- **The Federal Government should support science-based trials of improved land management practices.**
- **Investigations into adapting land use due to Climate Change.**

Issue 5 – Guarantee Funding for CLLMM Research Centre, Phase 2

The CLLMM Region of the Basin is the most complex environmental system in the whole Basin as it is where the freshwater meets the saltwater of the ocean and is effectively attacked from both sides. The freshwater side receives all the cumulative threats due to mismanagement of upstream activities including excessive extraction, water quality pollution due to farming and urban developments, bush fires, etc. While the saltwater side is threatened by river mouth closure due to siltation, sea level rise and storm surges.

On top of this, the River Murray downstream of the Darling River and associated aquatic and floodplain systems have been official listed as a critically endangered ecological community under the EPBC Act on January 15, 2026. This listing provides the highest level of federal legal protection and extends from the junction of the Murray with the Darling downstream to include the entire CLLMM Region.

The Science Program being delivered through the CLLMM Research Centre is actively involving the local community and Ngarrindjeri First Nations, and the knowledge generated helps guide and support the actions and decisions made across a range of focus areas with local groups across the region.

By securing its future sustainability, the CLLMM Research Centre will continue to be a valuable resource for the people and environment of the region and beyond.

Actions:

- **The Federal Government must provide funding for Phase 2 of the CLLMM Research Centre asap to ensure continuity of the scientific program.**

Issue 6 – Investigate the Impact of Sea Level Rise on the CLLMM Region

Sea level rise is already affecting the CLLMM region with overtopping of the barrages occurring more frequently and to a greater extent than ever before resulting in large volumes of saltwater entering the freshwater lakes system. The sand dunes of the Coorong are also receding and the amount of dredging to maintain the Murray Mouth open is increasing.

Actions:

- **Detailed investigation is needed urgently to determine the potential effects of Sea Level Rise on the CLLMM region.**

"What do you See as the Priorities?"

The Water Act, 2007 and MD Basin Plan are based on determining the ESDL by the best available science. This has not been done in this Review and stands as the biggest omission of the whole Review process. Hence this issue must be of the highest priority.

The impacts of Climate Change are the area of poorest understanding and the highest risk to volumes of River flow, land use practices and ecosystems of the Basin. The impacts of Climate Change have not been addressed in this Review and this must stand as the next highest priority behind determination of the current ESDL.

OTHER ISSUES OF MAJOR CONCERN TO RLCAG:

1. Climate Change:

Issue 1 – Adjustments to Protect Environmental Flows due to Climate Change

The Discission Paper suggests that adjustment of the SDL for Climate Change will be deferred until 2036. How then will reduced flows due to Climate Change through to 2036, effect Environmental Water Flows?

There appear to be three ways to deal with a lower SDL due to CC: the first is to cut extractive entitlements by straight percentage which will increase over time; the second is to buyback entitlements which would be extremely expensive; and the third is to do nothing which is what is being proposed but this is not an acceptable approach as environmental flows will be reduced and the Environmentally Sustainable Level of Take (ESLT) will be exceeded.

Actions:

- **The Environmentally Sustainable Level of Take (ESLT) must be re-evaluated biannually, using updated climate and hydrological modelling, with precautionary protections where uncertainty exists. and**
  - **Additional Environmental Water needs, over and above the current 3,200 GL/yr, recovered,**
  - **SDLs for each WRP must be reassessed,**
- **Extractive Water Entitlements must be reduced by an equal % as River flows, SDLs and ESLT reduce due to Climate Change.**

Issue 2 – Action to Protect Barrages from Sea Level Rise

Sea level rise of 150 to 200mm by 2050 will cause significant problems due to overtopping of the current barrage structures, and salt water through the sandhills and under the barrages due to the changed hydraulic pressures. Both of these scenarios will lead to increased salinity in Lake Alexandrina and Lake Albert. What options are available to arrest this problem? What is planned for the barrages as sea level rises?

The barrage gates need to be automated to allow more sophisticated control of water flows backwards and forwards through the barrages but there is concern about their structural integrity especially under higher hydraulic pressures due to sea level rise and storm surges associated with CC.

The barrages like other assets in the MDB are over 100 years old and are in dire need of repair or replacement. It is understood that the current estimate for required safety improvements is around $10bil with risk levels of some structures extremely high.

Actions:

- **A study of the impacts of increasing sea water ingress into the lakes and Goolwa Channel must be carried out to identify what early actions are needed to mitigate adverse environmental impacts.**
- **A detailed structural integrity study of the barrages must be carried out to assess their adequacy including the impacts of Climate Change.**
- **The barrage gates need to be automated to allow more sophisticated control of water flows backwards and forwards through the barrages.**

Issue 3 – Effect of Sea Level Rise on the Murray Mouth

What is the likely impact of sea level rise along the Australian coastline, due to Climate Change on the operation of the Murray Mouth?

Actions:

- **A study of the potential costs and benefits available for differing scenarios and potential solutions.**

2. Environmental Health / Invasive Pests:

Issue 1 – Removal of Constraints for Native Fish

What can be done to improve Native Fish Species numbers? The Sustainable Rivers Audit for the Lower Murray shows only fair connectivity - both longitudinal and lateral. What is the MDBA plan for relieving constraints to improve native fish breeding?

This must be a major priority in the management of Environmental flows as native fish numbers are well below what is desired.

Actions:

- **There are many constraints in the form of weirs and other structures hindering the free movement of fish. The Removal of these Constraints by the States as part of the SDLAM projects must be expedited.**

Issue 2 – Control of European Carp

What is planned to control European Carp? If biological control of carp goes ahead, what is the MDBA plan for clean-up of the tonnes of dead fish , especially in the Lakes ?

We understand that a decision on the deployment of a virus to control carp is many years away and this is unlikely to proceed. However other options such as subsidising industries that can productively process the carp for beneficial uses are not even being considered at this stage. Why aren't other options being considered at this stage?

Actions:

- **Options for the control of carp (other than a virus) need to be investigated and developed immediately and not wait for the outcome of the virus studies.**

Issue 3 – Community Awareness of Ramsar Wetlands

The whole CLLMM waterways are Ramsar listed but there is little to no public information available in the region. What can be done to raise public awareness of this Ramsar listing and what it means for the area?

Actions:

- **MDBA must fulfill the Federal Government's commitment to care for Ramsar listed wetlands by doing more to increase community awareness such as suitable signage.**

3. The Human Cost of River Health:

Issue 1 – Drive for Common Message for a Healthy River

River communities' wellbeing is intrinsically linked to the health of our rivers. We need a healthy environment for there to be healthy communities. Enough water needs to be left in the system, with end of river flows, to support healthy ecosystems, cultural practices, human and economic health. First Nations perspectives have long emphasised the deep connection between the health of rivers and the health of their people. The obvious but unstated connection extends to the connection between ALL people's health and good river health.

Actions:

- **There are a lot of competing messages for the needs of people along the river, one message needs to be agreed and shared; "A Healthy River" - we need to find a better way to share the same message along the river.**

Issue 2 – Need for Community Health Promotion Project

Past droughts reveal a profound social, mental and emotional toll. The incredibly sad statistic is that the suicide rate in the Strathalbyn area during the Millennium Drought was 4 times the national average. Tragically, this area of 'human cost' has NOT been meaningfully acknowledged in public discourse or policy, and no social accountability has been addressed. Sitting parallel to acknowledgement, there is a place here for a department within the MDBA where people can seek assistance (i.e. crisis line). Is this a possibility?

Actions:

- **The MDBA should develop a Community Health Promotion Project that may be used as a model throughout the MDB.**

Issue 3 – Need for Guidelines for Urban Development in MD Basin

In the Alexandrina Council area alone, there are plans to develop a further 10,000 new dwellings in the next decade. How will MDBA cope with the extra demands and challenges associated with a growing population and urbanisation of the Basin?

Actions:

- **MDBA must develop Guidelines for urban developments in the MD Basin which will protect the River from further urban pollution.**

4. The River as a "Living Entity":

Issue 1 – Recognition of the River as a "Living Entity".

Existing laws and institutions seem to be failing to protect our River. If we believe the science of Climate Change (which we do) finding new ways to protect our natural environment, in this instance Our River, is a growing challenge. Environmental Legal Personhood of the River is one approach. Recognising the River as a Living Entity, with its own needs, rights and intrinsic values, is another. A 'Living Entity' fits more with the Indigenous people's concept of 'Land and Water Rights' and 'Belonging'. The rigid separation between nature and humanity is inherently colonialist. Instead of focusing on what we want from the river, we should be asking: what do we want for the river, and how do we get there with the river? This perspective aligns with holistic catchment management, Indigenous knowledge systems, it aligns with our very own elders with generational wisdom who remember when the river ran differently.

- We support the First Nations consideration of the River as a living entity, with a right to exist and not treated just as an inert vessel for the transportation of water.
- It would demand a more ethical and precautionary approach to governance.
- This perspective will also go a long way to change the intergenerational shortsightedness about our River system that we are in danger of continuing.

Given that the process to gain legal entity status is fraught with challenges, the MDBA must at least acknowledge this and endeavour to raise public awareness and empathy towards understanding that they are living systems (entities) with intrinsic rights. Settler colonial law erased the role of Indigenous peoples as custodians of their land and waters, and the way in which their actions have sustained biodiversity for tens of thousands of years. Recognising rivers as living, ancestral beings may start to redress this injustice, as well as protecting rivers from ongoing assault.

Actions:

- **The MDBA must find ways to support a growing national & global understanding that Rivers are more than ecological assets, commodities to be traded, extracted to extinction, used as waste dumps and reduced solely to servitude.**

5. Water justice for First Nations.

The RLCAG supports the call for water justice for First Nations people. We acknowledge that the MDBA has been listening to Traditional Owners and does understand the impact of their inability to adequately care for country and the grave consequences to indigenous health of a lack of good quality water and a degraded environment.

Particularly distressing is the life expectancy statistic of First Nations living in Wilcannia in 2015 of 37 years for a male, 42 years for a female.

There seems to be a disregard for the different value system of First Nations people, whose wisdom recognises the intrinsic link between human health, wellbeing, and the wider environment. “If Country is sick, we are sick”. A wise “take what you need” approach, rather than a “take whatever you can”.

Historically, Australian water law and management practices have largely ignored or marginalised Aboriginal water rights. The Native Title Act 1993 acknowledged water rights as part of native title, but courts have primarily recognised rights for domestic and personal use.

The 2004 National Water Initiative was a landmark setup in formally recognising Indigenous water rights in national water policy.

Australia’s endorsement of the “UN Declaration of Water Rights for Indigenous people “in 2009, further emphasised Indigenous rights, including rights to water for cultural, spiritual and economic well-being.

We need to acknowledge the deep connection of First Nations people to the land and water and to their totems and the intrinsic need to protect them.

Real action needs to be taken urgently. Entitlements held by Aboriginal organisations across the Basin make up a tiny percentage of the total water (0.17%). Compare this to Foreign held entitlements of 11.3%. Even when the then Minister Littleproud announced in 2018 that $40 million was granted for Indigenous water - this was not delivered.

The Murray Darling Basin Aboriginal Water Entitlements Program has now been increased from $40 to $ 100 million which sounds a lot - but this is only aiming to boost First Nations water entitlements to 0.5% from the paltry, currently less than, 0.2%.

It is time to correct this injustice. We need to celebrate the wisdom of First Nations people in caring for the land and water for millennia while it has only taken 235 years of settlement to destroy the system.

We empathize with First Nations people who have watched the destruction of the ecosystem and agree there is now only a small window of opportunity to try to restore some of the damage. It is a sad reflection, when listening to the Ngarrindjeri dreaming stories of Ponde the Murray Cod, travelling the length of the Murray from the Darling to Raukkan on Lake Alexandrina, that Murray Cod have not been seen in the Lakes for generations.

There must be a high ambition aim to stop any further degradation and restore the riverine environment to support life and complex ecosystems, returning native fish numbers and diversity and providing unpolluted water, fit for use.

Indigenous knowledge can help drive sustainable water futures in a changed climate. Voices of Traditional Owners and lived experience need to be an integral part of climate action initiatives and discussions, with respect shown, knowledge protected and renumeration given.

The Commonwealth Environmental Water Holder (CEWH) and the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) have signed an agreement to 30 June 2028 for environmental watering to be undertaken in a way that uses local knowledge and experience, works effectively with local communities, and has regard to Indigenous values.

It is time to turn promises into action.

Actions:

- **Truth telling and meaningful engagement with the appropriate Cultural Authority.**
- **"Closing the Gap" principles implemented and enforced to change the way Governments work with Traditional owners by:**
  - **Formal partnerships and shared decision making**
  - **Building the community-controlled sector**
  - **Transforming government organisations**
  - **Shared access to data and information at a regional level**
- **Jurisdictional targets for inland waters to improve water management outcomes for Indigenous communities.**
- **Increase collaboration and engagement between governments, Indigenous communities, and other stakeholders are crucial for advancing Aboriginal water rights.**
- **Indigenous, cultural water must be recognised as a separate entity - not a re-labelling of environmental water. There should be a specific, separate allocation and funds provided to secure adequate water, fit for purpose.**

PART B - RESPONSE TO DISCUSSION PAPER QUESTIONS

"What do you think of the Issues and Options Presented?"

The Water Act, 2007 and Basin Plan, 2012 in large part, draw their constitutional mandate from the implementation of the Ramsar Convention, the Convention on Biological Diversity and related international treaties. As the Basin Plan was enacted before Australia committed to the Convention on Biological Diversity's Kunming–Montreal Global Biodiversity Framework (GBF), the Basin Plan Review provides a critical opportunity to align water reforms with the GBF to improve biodiversity outcomes while helping Australia meet its international obligations.

While the 2026 MDB Plan Review Discussion Paper acknowledges certain shortcomings and proposed improvement options, it fails to address specific meaningful outcomes. Strengthening administrative, planning and transparency functions, while welcomed, fail to provide any action or measures to address the shortfall in environmental flows.

We believe that the Basin Plan has failed to achieve its primary function to reverse over-allocation and to set extractions at an ecologically sustainable level of take. Self-interest and political opportunism have compromised the Basin Plan's good intentions and has failed to listen to 'best available science'.

The environment is certainly better off than what would have been without the MD Basin Plan 2012. However, the current Basin Plan has failed to meet more than half of the stated environmental objectives set out in the Plan.

"Are there Other Issues and Options that should be Considered?"

We note that the Discussion Paper explores particularly:

- Initial Assessment of Sustainable Diversion Limits (SDLs).
- Maximise the Benefit of Water for the Environment.
- Improve River Connectivity in the Northern Basin.
- Improve Floodplain and Wetland Health.
- Respond to Native Fish Decline.
- Managing Water Quality.
- Water Infrastructure and Critical Human Needs.
- Improving Basin Plan Regulatory Design.
- Improving Science and Knowledge to Improve Basin Water Management.

Other issues of major concern to RLCAG include:

- Climate Change.
- Environmental Health / Invasive Pests.
- The Human Cost of River Health.
- The River as a "Living Entity".

See Part A for details.

"What do you See as the Priorities?"

The Water Act, 2007 and MD Basin Plan are based on determining the ESDL by the best available science. This has not been done in this Review and stands as the biggest omission of the whole Review process. Hence this issue must be of the highest priority.

The impacts of Climate Change are the area of poorest understanding and the highest risk to volumes of River flow, land use practices and ecosystems of the Basin. The impacts of Climate Change have not been addressed in this Review, and this must stand as the next highest priority behind determination of the current ESDL.

Independent “quadruple bottom line” socio-economic studies for the MD Basin under the current Basin Plan have consistently shown that:

- economic outcomes have improved,
- social outcomes for small, isolated towns have diminished, but larger towns and regional centres have grown in population and prosperity,
- governance has improved with the appointment of the Inspector-General of Water Compliance (IGWC) established in 2021 and improved regulation of Water Markets introduced by the “Sustainable Rivers Act, 2023”.
- Environmental performance however, has failed to meet more than half of the environmental objectives listed in the Basin Plan, 2012.

The need for strong bold action to restore and protect the MD Basin environment has never been needed more than at this time. We need decisive action and political courage, along with strong and clear messaging, to achieve effective implementation and to secure sustainable management of the Basin’s water resources. A failure of water resource management to achieve and maintain a Healthy River will adversely affect all Basin communities.

Decisive, immediate intervention to halt the ecological decline in the CLLMM area is the highest priority as this will in turn improve the entire MD Basin system long term. If we under-resource this part of the system, we degrade everything upstream. A river dies from its mouth back throughout its catchment.

APPENDICES

Appendix 1 – Discussion Paper No.1: Water Quality Monitoring in the Lower Murray River, Lakes Alexandrina and Albert, the Coorong and Murray Mouth.

Appendix 2 – Discussion Paper No.2: Water Quality Targets for the Coorong, Lower Lakes and Murray Mouth Region.

Appendix 3 – Discussion Paper No.3: Control of Harmful Algal Bloom (HAB) in South Australian Marine Waters.

Appendix 4 – Breaking the Deadlock: Two-Tier Proposal for Constraints Relaxation Demonstration. Lifeblood Alliance.